PIT & QUARRY

FEBRUARY 1981

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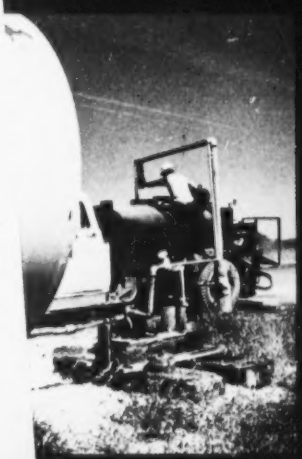

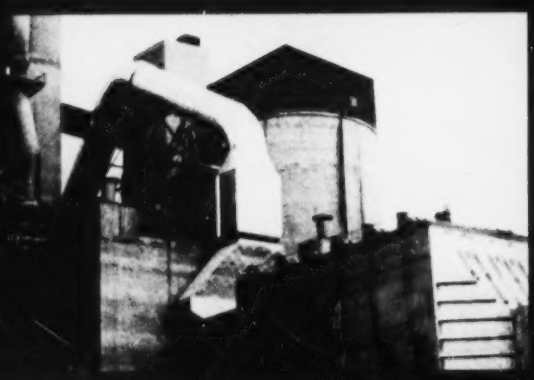

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AND NEXT MONTH

We include "focus" features on some material handling systems

ON THIS MONTH'S COVER

Various aspects of pollution control covered in focus features

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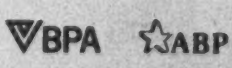

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The International Journal of Mechanical, Pneumatic & Hydraulic Handling, Storing & Transporting of Bulk Solids

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Rockport, MA 01966, USA

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COMPARISON OF MONTHLY/YEAR-AGO CONSTRUCTION CONTRACT VALUES*

	1980 Nov.	1979 Nov.	% Change
Nonresidential Building	$ 5,007.9	$ 3,732.8	+34
Residential Building	5,847.1	4,704.1	+24
Nonbuilding Construction	2,441.2	3,295.1	−26
Total Construction	$ 13,296.2	$ 11,732.0	+13

	1980 11 mos.	1979 11 mos.	% Change
Nonresidential Building	$ 47,767.1	$ 46,717.2	+ 2
Residential Building	57,654.8	70,356.1	−18
Nonbuilding Construction	29,271.3	40,926.8	−28
Total Construction	$134,693.2	$158,000.1	−15

DODGE INDEX
(1972 = 100, seasonally adjusted)

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**Based on statistics compiled by F.W. Dodge Div., McGraw-Hill Information Systems Co.*

Martin Marietta Awards Baghouses Contract

Flex-Kleen Corp., a Research-Cottrell Environmental company, has received an order from Martin Marietta which includes the first baghouses to meet the new explosion containment standard for coal handling equipment. The contract is for 19 pulse jet baghouses to collect dust from coal, cement, and limestone in 24 cement plant process areas. Three of the 19 dust collectors will filter coal mill dust and meet the new explosion containment specs.

The baghouses will go into Martin Marietta's Davenport, Ia. cement plant. Scheduled for operation in August 1981, the $80-million plant is designed for an annual output of 850,000 tons.

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North American cement companies: capacities and ownership

Changes in the corporate structure of the United States cement industry are continuing. A number of companies have been acquired by, or merged with, U.S. conglomerates or foreign interests in the past several years. Canadian company inter-relationships were increased last year with Genstar Ltd.'s acquisition of The Flintkote Co.

Current ownership of North American cement companies is shown in this PIT & QUARRY compilation. Approximate annual capacities, as of the end of 1980, are given for the parent company as well as the number of plants in the United States and Canada. The capacity data include gray, white, and grinding-only plant production. ●

Company	Subsidiary of:	Capacity-mstv (number of plants)	
		United States	Canada
Aetna Cement Corp.	Lake Ontario Cement Co. (Canada)		*
Alamo Cement Co.	Cementeria Robilante (Italy) & Cementwerke Vigier (Switzerland)	.470 (1)	
Allentown Cement Div. (National Gypsum Co.)	General Dynamics Corp.	*	
Alpha Portland Cement Co.	Alpha Portland Industries, Inc.	2.050 (6)	
Amcord, Inc.	Gifford-Hill & Co., Inc.	*	
Arkansas Cement Corp.	Arkansas Louisiana Gas Co.	.850 (1)	
Ash Grove Cement Co.		1.306 (2)	
Atlantic Cement Co., Inc.	Newmont Mining Corp.	1.550 (1)	
Arizona Portland Cement Co.	California Portland Cement Co.	*	
Bessemer Cement Co.	Louisville Cement Co.	*	
California Portland Cement Co.		3.030 (3)	
Canada Cement Lafarge, Ltd. (Canada)		1.040 (1)	6.490 (13)
Centex Cement Corp.		.300 (1)	
Ciment Quebec, Inc. (Canada)			.480 (1)
Citadel Cement Corp.	Canada Cement Lafarge, Ltd. (Canada)	*	
Columbia Cement Corp.	Filtrol Corp.	.905 (2)	
Coplay Cement Manufacturing Co.	Societe des Ciments Francais (France)	1.100 (2)	
Cyprus Hawaiian Cement Corp.	Cyprus Mines Corp.	.270 (1)	
Dundee Cement Co.	Holderbank Financiere Glarus AG (Switzerland)	3.480 (3)	
Federal White Cement Ltd. (Canada)			.121 (1)
Flintkote Co., The	Genstar Ltd. (Canada)	*	
Florida Mining & Materials Corp.	Moore McCormack Resources Inc.	.660 (1)	

Company	Subsidiary of:	Capacity-mnty (number of plants)	
		United States	Canada
General Dynamics Corp.		3.210 (2)	
General Portland Inc.		4.892 (8)	
Genstar Ltd. (Canada)		3.100 (4)	2.215 (5)
Giant Portland Cement Co.		.855 (1)	
Gifford-Hill & Co., Inc.		6.112 (6)	
Gifford-Hill Portland Cement Co.	Gifford-Hill & Co., Inc.	*	
Gulf Coast Portland Cement Co.	McDonough Co.	.900 (1)	
Hercules Cement Co. (Amcord)	Gifford-Hill & Co., Inc.	*	
Huron Cement Div. (National Gypsum Co.)	General Dynamics Corp.	*	
Ideal Basic Industries, Inc.		6.460 (13)	
Illinois Cement Co.		.376 (1)	
Independent Cement Corp.	St. Lawrence Cement Co. (Holderbank Group) (Canada)	*	*
Independent Cement Inc. (Canada)			1.200 (1)
Inland Cement Industries Ltd. (Canada)	Genstar Ltd.		*
Kaiser Cement Corp.		3.743 (5)	
Keystone Portland Cement Co.		.625 (1)	
Lake Ontario Cement Ltd. (Canada)		.550 (1)	1.670 (1)
Lehigh Portland Cement Co.	Portland Zementwerke Heidelberg AG (West Germany)	3.200 (5)	
Lone Star Industries, Inc.		8.665 (13)	
Lone Star Lafarge Co.	Lone Star Ind. & Lafarge Fondu International	NA (1)	
Louisville Cement Co.		2.470 (3)	
Marquette Cement Co.	Gulf + Western Industries Inc.	4.117 (17)	
Martin Marietta Cement	Martin Marietta Corp.	4.736 (8)	
Medusa Cement Co. (Medusa Corp.)	Crane Co.	4.124 (4)	
Miron Inc. (Canada)	Ghaith R. Pharaon (Saudi Arabia)		1.160 (1)
Missouri Portland Cement Co.	H.K. Porter Co., Inc.	2.630 (3)	
Monarch Cement Co., The		.900 (1)	
Monolith Portland Cement Co.		.700 (1)	
National Cement Co., Inc.	Societe des Ciments Vicat (France)	.800 (1)	
National Portland Cement Co. of Florida, Inc.	National Portland Cement Co., The	.350 (1)	
Nevada Cement Co.		.400 (1)	
National Gypsum Co., Cement Div.	General Dynamics Corp.	*	
North Dakota Cement Co.	Canada Cement Lafarge Ltd. (Canada)	(sales office)	
Northeast Cement Co.	Citadel Cement Corp. (Canada Cement Lafarge) (Canada)	(sales office)	
North Star Cement Ltd. (Canada)			.150 (1)
Northwestern States Portland Cement Co.		1.000 (1)	
OKC Corp.	in liquidation		
Oregon Portland Cement Co.		1.500 (3)	
Peerless Cement Co. (Amcord)	Gifford-Hill & Co., Inc.	*	
Penn-Dixie Industries, Inc.		2.417 (8)	
Phoenix Cement Co. (Amcord)	Gifford-Hill & Co., Inc.	*	
Portland Cement Co. of Utah	Lone Star Industries, Inc.	*	*
Puerto Rican Cement Co.		1.200 (1)	
Rinker Materials Corp.		.520 (1)	
River Cement Co.	IFI International S.A. (Italy)	1.200 (1)	
Riverside Cement Co. (Amcord)	Gifford-Hill & Co., Inc.	*	
St. Lawrence Cement Co. (Canada)	Holderbank Financiere Glarus A.G. (Switzerland)		2.700 (2)
St. Marys Cement Co. (Canada)	St. Marys Cement Ltd.	.400 (1)	1.780 (2)
San Juan Cement Co., Inc.		.810 (1)	
Santee Portland Cement Corp.	Dundee Cement Co.	*	
SME Cement, Inc.	Standard Machine & Equipment Co.	.375 (1)	
South Dakota Cement Commission	State of South Dakota	1.000 (1)	
Southwestern Portland Cement Co.	Southdown, Inc.	2.960 (5)	
Texas Cement Co.		.500 (1)	
Texas Industries, Inc.		2.830 (3)	
Universal Atlas Cement Div.	United States Steel Corp.	1.943 (4)	
Whitehall Cement Manufacturing Co., The		.790 (1)	
Wyandotte Cement, Inc.	St. Marys Cement Co. (Canada)	*	

**See parent company; capacity included in that data*

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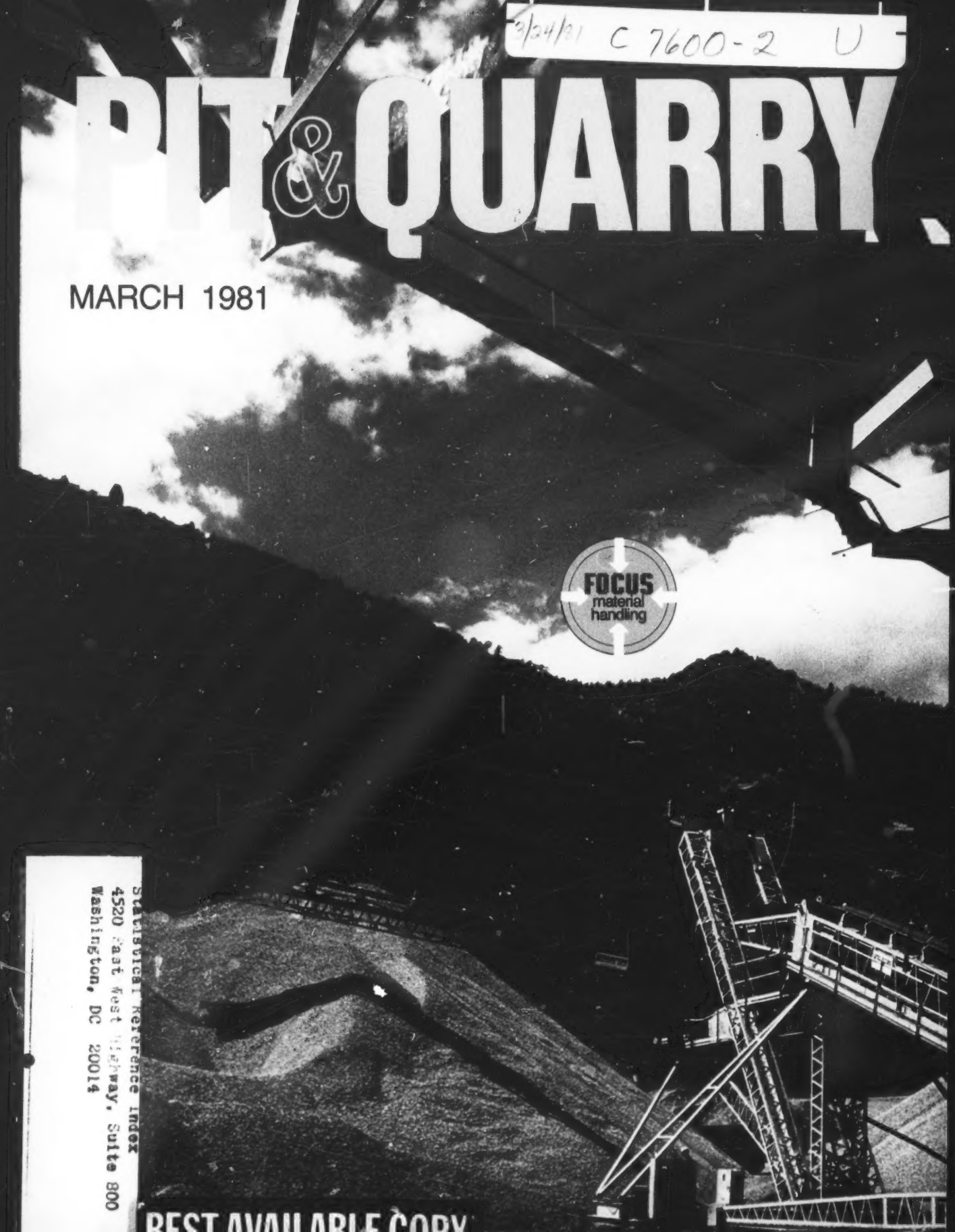
MARCH 1981

FOCUS material handling



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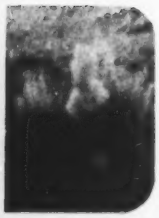

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AND NEXT MONTH

Major features center on drilling and blasting operations

ON THIS MONTH'S COVER

A major material handling system in the impressively revamped and expanded Morrison quarry operation of Cooley Gravel Co. See page 58. Staff photo.

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grew out of International Harvester's association with Bumar, the Polish Foreign Trade Enterprise with whom IH has had manufacturing licensee agreements for many years.

Earlier in 1980, IH purchased 50% equity in Mec-Track (Italy), manufacturer of crawler undercarriage parts. In January of this year, IH established another new company called Minter, a joint venture with the National Bank of Mexico. Minter will manufacture and market IH products in Mexico and export throughout Central America and South America.

COMPARISON OF MONTHLY/YEAR-AGO CONSTRUCTION CONTRACT VALUES*

	1980 Dec.	1979 Dec.	% Change
Nonresidential Building	$ 4,708.8	$ 3,428.4	+37
Residential Building	5,569.5	4,173.2	+33
Nonbuilding Construction	2,234.6	2,737.3	−18
Total Construction	$ 12,512.9	$ 10,338.9	+21

	1980 12 mos.	1979 12 mos.	% Change
Nonresidential Building	$ 52,344.9	$ 50,205.9	+ 4
Residential Building	63,206.0	74,557.5	−15
Nonbuilding Construction	31,612.9	43,682.5	−28
Total Construction	$147,163.8	$168,445.9	−13

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(1972 = 100, seasonally adjusted)

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**Based on statistics compiled by F.W. Dodge Div., McGraw-Hill Information Systems Co.*

Bulldozer Noise Control Workshops Scheduled

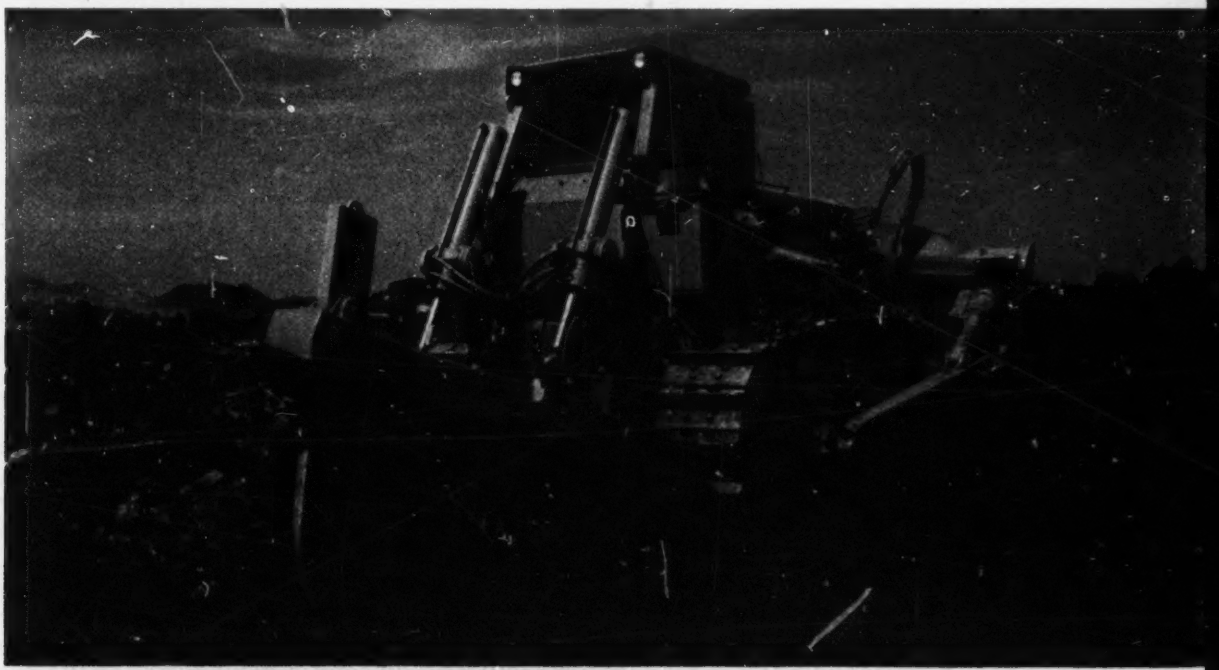
The Bureau of Mines is sponsoring a series of free 1-day workshops on Bulldozer Noise Control. The workshops will run from April 7 through May 15 and are open to all mining industry personnel. All participants will receive a 250-page Bulldozer Noise Control manual.

Workshops will be held in Denver (Apr. 7); Salt Lake City (Apr. 10); Boise, Idaho (Apr. 13); Reno, Nev. (Apr. 15); San Francisco (Apr. 17); Los Angeles (Apr. 24); Phoenix (Apr. 27); Tucson (Apr. 28); Albuquerque (May 1); Oklahoma City (May 6); Dallas (May 8); Tampa, Fla. (May 12); and Washington, D.C. (May 15).

To obtain more information on the Bulldozer Noise Control workshops contact: Carol Prybylo, Bolt Beranek and Newman Inc., 50 Moulton St., Cambridge, Maine 02238.

Major Area Lime Producer Changes Name to Fit Role

Black River Mining Company, Butler, Ky., changed its name the



Do successful ripper operators really take the time and trouble to specify KELLEY

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Blasting

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AND NEXT MONTH

New lime plant developments
Nonelectric delay blasting system helps U.S. Gypsum quarry safely at New Braunfels, Tex. site

ON THIS MONTH'S COVER

Several features in this issue focus on factors encountered in drilling and blasting. Appropriately, our cover depicts the initiation of a carefully planned quarry shot. Photo courtesy of the DuPont Co., Explosives Products Division.

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Lois Esmail Joins Staff As Circulation Director

We are pleased to announce that Lois G. Esmail has joined the staff of Pit and Quarry Publications, Inc. as circulation director. Lois was circulation manager for Kiver Publications from 1974.

L. G. Esmail

Prior to that, she was associated with Poole Brothers Printing Company for 10 years as circulation representative for all publications.

Lois, a member of the Business Publication Production Club, resides in Wilmette, Ill. She enjoys skiing and reading in her leisure time.

COMPARISON OF MONTHLY/YEAR-AGO CONSTRUCTION CONTRACT VALUES*

	1981 Jan.	1980 Jan.	% Change
Nonresidential Building	$ 4,122.0	$ 4,278.5	- 4
Residential Building	4,206.6	4,055.3	+ 4
Nonbuilding Construction	2,138.7	2,606.7	- 18
Total Construction	$ 10,467.3	$ 10,940.5	- 4

DODGE INDEX
(1972 = 100, seasonally adjusted)

November, 1980 ..... 210 December, 1980 ..... 193 January, 1981 185

**Based on statistics compiled by F.W. Dodge Div., McGraw-Hill Information Systems Co.*

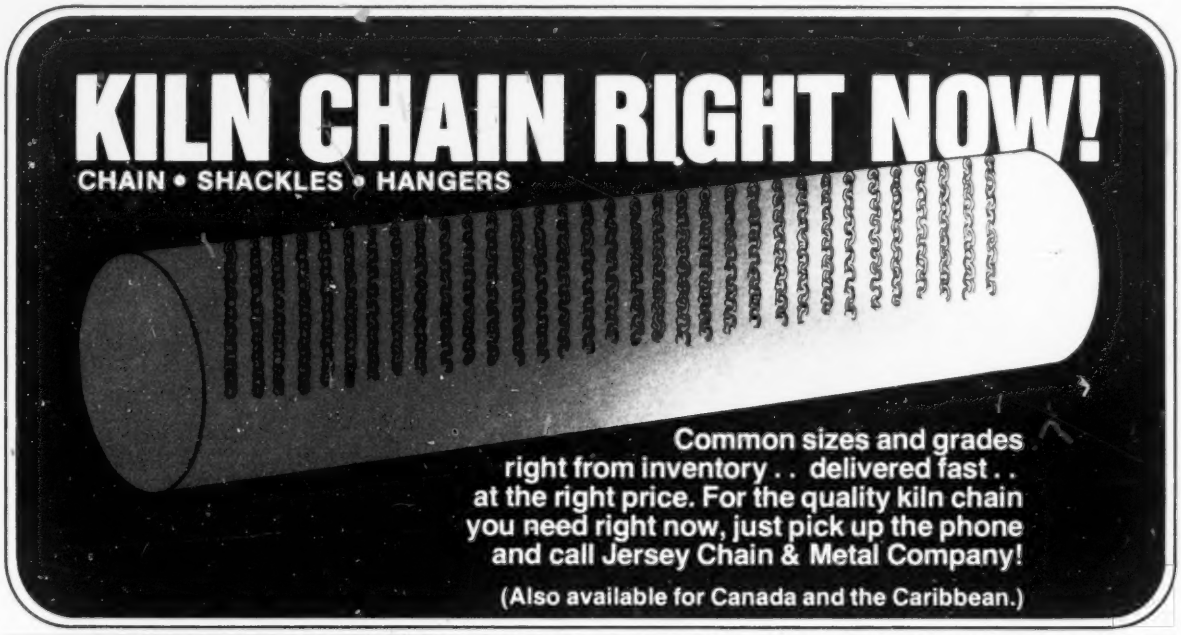
Change of Dates For SME-AIME Fall Meeting

The Society of Mining Engineers (SME) of AIME has announced a change in the dates of the 1981 SME-AIME fall meeting and international conference on caving and sublevel stoping to be held in conjunction with the fall meeting. The meeting will be held November 18-20, 1981, Denver, Colo., at Currigan Hall. It was originally scheduled for October.

Technical programming at the fall meeting will cover up-to-date developments in the fields of coal, industrial minerals, mining and exploration, mineral processing, and mineral economics.

A technology information exchange exhibit sponsored by the SME will feature displays of the latest products and services from manufacturing and equipment firms, consulting organizations, educational and research institutions, and government agencies.

Technical sessions of the international conference on caving and sublevel stopping include block caving, sublevel caving, sublevel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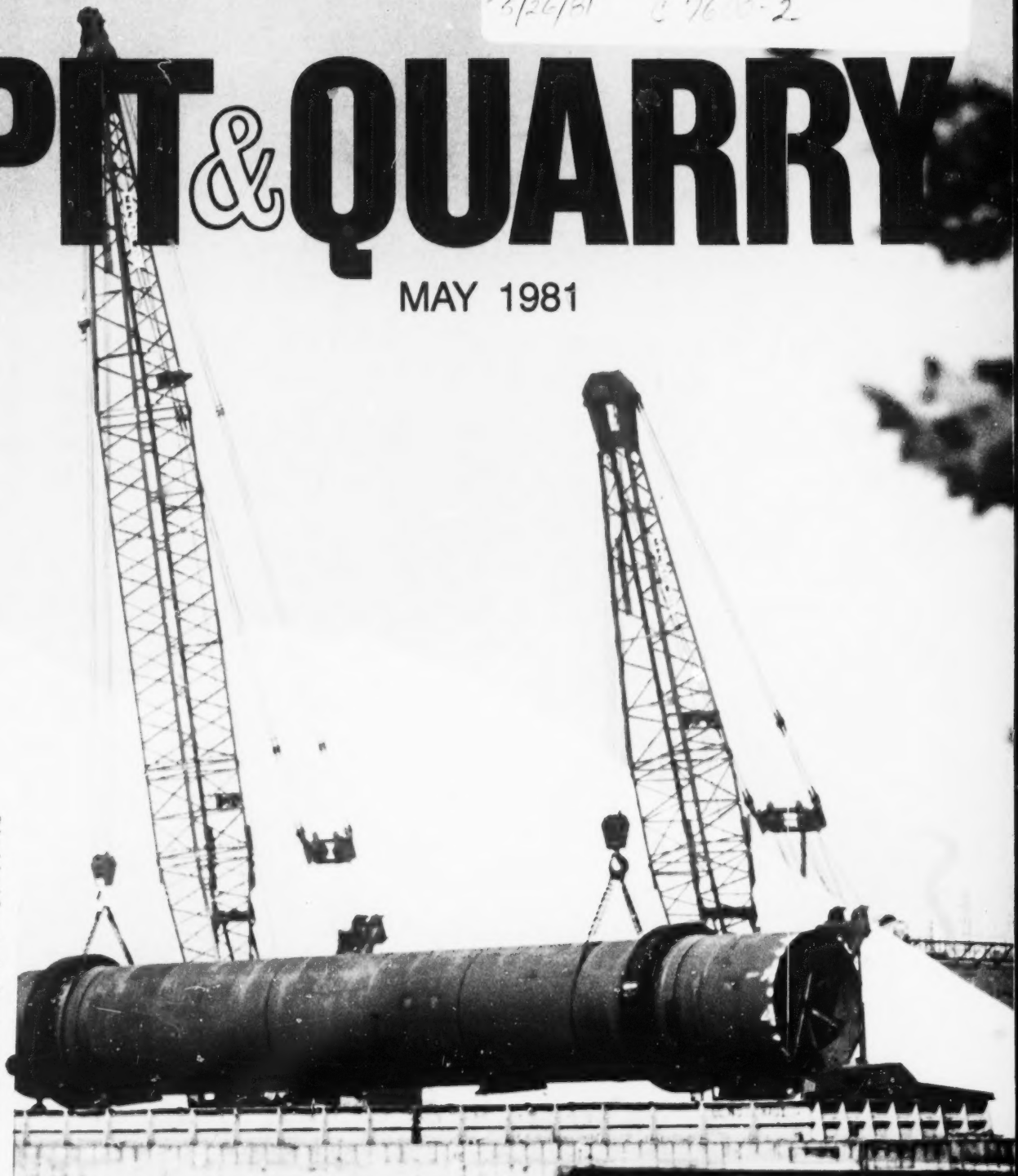
MAY 1981



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One of the massive kiln segments for the world's largest single lime-producing rotary units required two 200-ton capacity cranes for off-loading from the barge at Marblehead Lime Co.'s South Chicago, Ill. plant.

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MEMBER

BPA ABP

Aglime—a business, not a service

BY BRUCE W. REMICK
Director of Aglime Marketing
National Crushed Stone Association

If you were to ask prominent agriculturalists what they regard as the practices most essential to crop production, most would place the correction and maintenance of soil pH high on their list of priorities. Most of them also would agree that agricultural limestone probably is the most effective material available for that purpose.

The practice of liming is not new. In fact, the farmers of antiquity limed their soils because, although they may not have understood why, they observed that where they applied lime, crops seemed to grow better and the land yielded greater quantities of food. In terms of 20th century agriculture, excessive soil acidity has become widely recognized as a primary cause of reduced productivity. Where aglime has been properly used (it represents more than 90% of all liming materials used in the United States), it has resulted in significant benefits to the agricultural producer, in terms of increased productivity and income, at very low cost.

The cost efficiency and potential return which the farmer can realize by using aglime becomes readily apparent upon examination of existing yield data produced during research trials conducted at various U.S. locations.

For example, in a 4-year Ohio trial concluded in 1979 (Table 1), the total cumulative alfalfa yield produced in three aglime-treated plots averaged twice that produced in those plots where aglime was not applied. In a "real-life" situation, this added production would have represented an increased return to the alfalfa grower of from $2.97 to $10.20 per dollar spent on aglime whether he sold it or used it to feed his own herd. Because dry alfalfa hay contains 10-20% digestible protein, he also could have realized a savings from the reduction in purchases of protein feed concentrates.

In another 1975 Maryland trial designed to measure the effect of aglime and fertilizer on corn yields (Table 2), results clearly showed that they increased grain production, where applied individually, while each complimented the yield effect of the other when applied together.

In a series of field trials, conducted at 10 scattered southeastern U.S. locations from 1939 to 1964, cotton yield increases, averaging 502 lbs. per acre, were obtained by applying aglime. The unlimed soil pH for all locations averaged 5.1[1]. Although this data may not be recent, the type of response described here is repeatable. Conclusions based on statistical evaluations of other aglime response data indicate that cotton will respond to aglime on many southern soils when the soil pH falls below 6.[2] In the above situation, on the basis of an average U.S. cotton price of 74½¢ per pound,[3] and with aglime costing $15 per ton spread on the field at the rate of 2 tons per acre, the cotton producer, who achieves similar production increases under today's market conditions, should realize a net return increase of $10 or more per dollar spent on aglime even if he charged his total aglime cost to the first crop following application.

Aglime makes sense

The preceding data are self-evident. Similar examples are plentiful. Each demonstrates that the application of aglime, when done on the basis of sound recommendations provided by ac-

credited soil testing laboratories and in conjunction with other accepted crop production practices, makes good agronomic and economic sense.

Despite the recognized importance of liming to production agriculture, the total aglime tonnage applied in the United States historically has fallen critically short of that required nationally to maintain the pH of our agricultural soils at agronomically acceptable levels. The percentage actually used typically varies among states in any given year; the best estimates now available put actual usage at about 30 to 33% of the tonnage needed nationally to properly lime our agricultural soils. These figures have major significance for the U.S. aglime industry.

According to the U.S. Bureau of Mines, 1978 aglime loadings, "at the quarry" on a national basis, totaled 33.2 million tons.[4] This compares with a national annual need estimate of more than 90 million tons.[5] In effect, 57 million tons of aglime went unsold. At an average value of $3.14 per ton of aglime, F.O.B. the quarry, calculated from the above U.S. Bureau of Mines data, this additional 57 million tons could have represented $179 million in added 1978 sales if the U.S. aglime industry had chosen to go after the business. Unrealized aglime sales in 1979,[6] at a value of $3.53 per ton of aglime, totaled more than $200 million.

Obstacles to sales

These figures imply the existence of several negative factors in the marketplace which are contributing to low aglime acceptance and usage. Farmer attitude is a major negative factor. Although the use of fertilizer and agricultural chemicals has become an annual event on most U.S. farms, the application of aglime, even when the need is strongly indicated by soil analysis, is frequently carried out on a "if weather and time permit" basis only after other crop operations have been completed.

The results of fertilizer and agricultural chemical application usually appear during the crop year in which they are applied. The visible effects—in terms of crop growth, yield response, weed and insect control—satisfy the farmer's concern for immediate, tangible evidence of money spent. Aglime, on the other hand, breaks down and reacts slowly with the soil. Its effects may not appear for 1 to 2 years after application; crop response usually is not dramatic. But aglime, with its capability to neutralize soil acidity, to increase the effectiveness of high cost fertilizers and agricultural chemicals in the process, and to improve overall soil fertility, represents, under acidic soil conditions, one of the farmer's most cost effective means of increasing the productivity and profitability of his business.

The slow acting nature of aglime also is believed to affect its use on thousands of acres of rented crop land every year. Many farmers rent additional land as a means of increasing their production base without having to increase their indebtedness by purchasing more acreage. Some farm *only* on land under contract. Whichever category they are in, farmers renting land are frequently hesitant to spend operating capital on products, like aglime, particularly where short-term (1- and 2-year) rental agreements or contracts are involved. The shorter the term, the greater the tendency to use faster-acting fertilizer and liming materials and to apply them at lower rates. It has been estimated that from 40 to 60% of the crop lands in many of our major agricultural states, such as Ohio, Illinois, Iowa, and others, are under some form of rental agreement—a significant acreage which, most likely, is not being adequately limed.

From its inception in 1936 until the early 1970s, the Agricultural Conservation Program was a major factor in aglime usage. The agricultural use of limestone to neutralize soil acidity was encouraged and largely supported with federal cost-sharing funds provided through the ACP program. Because the conservation of soil and water resources always has been the stated objective of the ACP program, the use of aglime came to be associated with that objective as well; its value in crop production was de-emphasized. Although aglime's use on crop land qualified for cost-sharing in certain cases, eligibility still was based on use for conservation-related purposes. Since 1973, the program has gone through a series of revisions which limit cost-share eligibility for production-

Table 1—Total Yield and Return on Investment Effect of Aglime on Alfalfa Yield and Income

Soil pH after cropping	Lime applied 1974 (T/A)	Yield 12% H20 hay (T/A)	Yield increase over check (T/A)	Value of increased yield/a ($/A)	Cost of lime/b ($/A)	ROI Added Return Per $1.00 Spent on Aglime
5.	0	8.1				
5.6	2.5	14.1	6.	$420.00	$ 37.50	$10.20
5.9	5.	17.1	9.	630.00	75.00	7.40
6.	10.	16.6	8.5	595.00	150.00	2.97

/a Alfalfa at $70/T
/b Lime at $15/T
R.O.I.—Return on Investment

Source: John F. Trierweiler, Ohio State University

Table 2—Aglime-Fertilizer Interaction and Corn Yield Response

Plot	Yield Bus./Acre	Value of Corn (@) 2.75 Bu.	Fertilizer (1) Cost	Aglime Cost (2) @ $15/Ton (3 Year Period)	Value Over Untreated Plot	Net Return on Each Invested
1	22.7	62.43	none used	none used	0	0
2	98.7	271.43	$52.20	none used	$209.00	$3.00
3	47.5	130.63	none used	$10.00	68.20	5.82
4	114.1	313.78	$52.20	10.00	251.35	3.04

(1) Fertilizer cost for one year
(2) Aglime cost @ 2 tons/acre pro-rated over 3 years

Source: V. Allan Bandel, University of Maryland

related practices. The Agricultural Appropriations Act of 1979, the umbrella legislation under which ACP falls, clearly excludes from eligibility all practices which are "primarily production-oriented or that result in significant economic benefits to the farmer or rancher".[7] The application of agricultural limestone to increase the production of corn, soybeans, cotton, and other commercial crops falls into this category.

Although discussion to this point has concerned national usage trends and statistics, you probably can identify one or more of the market factors described as having a direct effect on your aglime business. Barring unforeseen downturns in the agricultural economy, unfavorable weather, and other adverse factors which can affect farmer's decisions to buy aglime, the prevailing trend in aglime usage *can be reversed*. As a marketer of aglime, whether you are a producer or a vendor, you can do a lot in your market area to get the process started.

A business—not a service

Make product conveniently available. Vendors should inventory their aglime needs in advance of the spreading season to assure that they have the capability to deliver and spread as soon as weather and soil conditions permit. Those who do not have storage should set prearranged procurement and delivery schedules with the limestone quarries in their area. This will require giving the local quarry an estimate of your aglime needs by month or season so that it can adjust its production schedule to meet your needs. Where possible, encourage farmers to stockpile aglime on the farm. Thus, delivery will be assured and they can spread aglime as their work schedules permit. Spreading equipment should be kept in good running order and in proper adjustment so it will be ready to go when conditions are right.

Emphasize to your customers that aglime can be applied at any time of year. Some farmers tend to think the fall months are the only time to apply aglime. In fact, any time of year is suitable if weather and soil conditions permit. For example, the spring season is ideal for areas scheduled for seeding of legumes (especially alfalfa) in the fall of the current year or where soybeans will be planted a year from the present season.

Spread aglime properly. A job well done brings customer satisfaction and repeat business. Spread at the proper rate. Shortchanging the farmer on rate of application makes it impossible for aglime to achieve the desired result and undermines his confidence in the ability of aglime to resolve his soil acidity problems. Apply aglime uniformly. Uneven application can cost the farmer in uneven growth and yields and the dealer or vendor in valuable time spent in resolving customer complaints.

Sell aglime on its merits and do it with enthusiasm! Producer representatives talking to vendors, and vendors talking to farmers, should extol the value of aglime as an essential crop production tool with the capability to significantly increase not only crop growth and yield but farm income as well. Vendors, especially when discussing soil fertility with their customers, need to emphasize the economic returns possible with the proper application of aglime. Use state, county, or local data to prove your point.

Use every available channel to "get the message out" to your market. Aglime vendors can begin the educational process, during consumer meetings or annual appreciation dinners, by blocking out time on the program to talk about aglime. For added impact, invite someone from the agricultural college or Cooperative Extension Service to talk on the subject. Distribute aglime literature at these meetings, at other points of customer contact, including the vendor or dealer's place of business, by direct mail, and on customer calls. Emphasize the need for aglime at every opportunity. Remind farmers often of the harmful effects of soil acidity on soil productivity, fertilizer efficiency, herbicide effectiveness, and farm income.

Make effective use of the media (newspapers, radio, billboards, etc.) to promote aglime. Advertise in advance of, or during, the aglime spreading season. Producers, vendors, and full-supply dealers, when buying space in the local newspaper to promote fertilizer, agricultural chemicals, and seed, should give aglime equal emphasis in their advertising programs. Create demand by stressing benefits rather than price.

Work toward improvement in the format for land owner-renter contracts. Crop land under written or verbal contract probably constitutes a significant percentage of the agricultural acreage in many of the counties served by local aglime producers and their vendors. Short-term contracts discourage use of slow-acting crop production items, such as aglime, especially by renters who want to see a return on every dollar spent the year the expenditure is made. Increased contract length and terms favoring more equitable sharing of costs between land owner and renter can help open up what is likely a very significant aglime market in your area.

Sell aglime at a profit. By supplying and delivering aglime to the farmers in his area, the producer and/or vendor is performing a valuable service and should pay himself for doing so! Don't sell aglime as a "give away" item or as a loss leader. It is a product of value to production agriculture and should be sold on that basis. Producers and vendors who are not doing so may be missing a good market opportunity. ●

References

1. Adapted from Chapter 4, American Society of Agronomy, Monograph No. 12, "Response to Lime in the Southern United States and Puerto Rico," by Fred Adams and Robert W. Pearson, 1967
2. *Crop Response to Aglime, A Statistical-Economic Evaluation,* Harry H. Hall, TVA Bul. No. Y-155, 1979
3. *Agricultural Prices,* Crop Reporting Board-ESS-USDA, February 27, 1981
4. *Stone in 1978,* Mineral Industry Survey, U.S. Bureau of Mines
5. Land Grant College data
6. Adapted from *Stone in 1979,* Mineral Industry Survey, U.S. Bureau of Mines
7. Agricultural Conservation Program, ASCS Bul. BI No. 10, July 1979

(continued from page 32)

plants and quarries with combined annual capacity of more than 4 million tons. They will become a part of Martin Marietta Aggregates Company's Southeast Div., which is headquartered in Raleigh, N.C.

Computer Controls Rotary Lime Kiln

A computerized rotary lime kiln control system at Louisiana Pacific's Somoa pulp mill near Eureka, Calif., has reduced natural gas consumption by at least 8%. Designed by Boeing Engineering and Construction Co. and installed in mid-1980, the system has met other goals, including improved process control, more uniform white liquor strength, more uniform precoat operation, and reduced stress on equipment due to high temperature peaks.

"As early as 1976 we could see that rapidly rising fuel costs would make development of a computer control system for rotary kilns economically feasible," explained Ray Bailey, process systems manager of Boeing's Energy Control Systems organization. "In many cases, the kiln is the largest user of natural gas in a pulp mill operation, and our studies indicate the computer system can pay for itself in two years."

The 8% savings figure at Louisiana-Pacific is derived from current use compared to last year's average. The savings are expected to be higher; the value will be known more exactly after a longer period of computer operation.

According to Fred Martin, technical director at Louisiana-Pacific, the temperatures in the kiln are more uniform and definitely lower than before the computer was installed. Hot lime exiting the kiln is just barely incandescent. Equipment and refractory is expected to last longer. Reduced temperature will ease thermal stress on all equipment exposed to hot lime.

"As was expected," said Martin, "fluctuations in liquor strength to the digester have been reduced, and we have noticed slightly less lime is needed to achieve normal liquor strengths because of improved temperature control in the slaker bowl."

Another benefit of computer control is flexibility in plant operation. Operating temperature can be turned for lime impurity levels. Production rate changes are much smoother. The computer provides a centralized display of important operating variables, and operator workload is substantially lower.

COMPARISON OF MONTHLY/YEAR-AGO CONSTRUCTION CONTRACT VALUES*

	1981 Feb	1980 Feb	% Change
Nonresidential Building	$ 4,085.2	$ 3,484.6	+ 17
Residential Building	4,205.6	4,364.9	– 4
Nonbuilding Construction	2,114.4	2,333.1	– 9
Total Construction	$ 10,405.2	$ 10,182.6	+ 2
	1981 2 mos.	**1980 2 mos.**	**% Change**
Nonresidential Building	$ 8,193.6	$ 7,769.2	+ 5
Residential Building	8,402.8	8,416.8	– –
Nonbuilding Construction	4,211.6	4,936.6	– 15
Total Construction	$20,808.0	$21,122.6	– 1

DODGE INDEX
(1972 = 100, seasonally adjusted)

December, 1980 ..... 193 January, 1981 ..... 185 February, 1981 177

**Based on statistics compiled by F.W. Dodge Div., McGraw-Hill Information Systems Co.*

Con/Agg Preview

Manufacturers interested in exhibiting at the 1982 International Concrete and Aggregates Show, scheduled for February 7-11 in Las Vegas, recently had an opportunity to meet with the show staff and tour the Las Vegas Convention Center.

At a March preview, held at Caesar's Palace, associate members of the three co-sponsoring associations heard presentations concerning exhibit space, the computerized registration system, plans for national and international promotion of the biennial event, and services available to exhibitors.

William L. Carter, president of the National Crushed Stone Association, welcomed the prospective exhibitors on behalf of NCSA, the National Sand and Gravel Association, and the National Ready Mixed Concrete Association. The three industry groups co-sponsor the event every 2 years. In 1982, as in previous years, the show will be held conjointly with the associations' annual conventions. The exhibit attracts more than 20,000 visitors from every corner of the globe.

Co-chairmen of the Exhibit Committee are John E. Mahoney, P&H Harnischfeger, Milwaukee, Wis., and Harold E. Buckler, C. S. Johnson Co., Champaign, Ill. More information about Con/Agg 1982 is available from the Show offices at NRMCA/NSGA headquarters, 900 Spring St., Silver Spring, Md. 20910. Terry L. Peters is convention & exhibit coordinator.

ILPA Elects Schildberg President

John E. Schildberg, vice president of Schildberg Construction Co., Greenfield, Ia., has been elected president of the Iowa Limestone Producers Association. Jeff C. Roverud, secretary-treasurer of Roverud Construction Inc., Decorah, Ia., was named as president-elect. The appointments were made during the 36th annual convention held recently.

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INTERNATIONAL MINING EXHIBITION AND CONGRESS

Düsseldorf, West Germany
June 11-17, 1981

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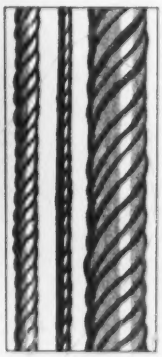

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AND NEXT MONTH

Our annual special section devoted entirely to new developments in the portland cement industry.

ON THIS MONTH'S COVER

After blasting in this oolitic limestone quarry in south Florida, shot rock is removed from lake bottom by dragline for feed to a barge-mounted crusher. Photo courtesy General Portland, Inc.

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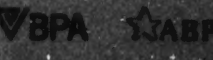


Industry News

Kaiser Cement Plans Cushenbury Plant Expansion

Kaiser Cement Corp., Oakland, Calif., has awarded a contract to Kaiser Engineers, Inc., Oakland, a wholly owned subsidiary of Raymond International, for the modernization and expansion of its Cushenbury cement plant in southern California.

Kaiser Engineers will perform engineering, procurement and construction management for the $120-million modernization program, which will convert the existing 1-million-tpy wet process plant into a 1.5-million-tpy dry process plant.

Construction is underway with completion scheduled for the last quarter of 1982. Kaiser Engineers designed and built the original Cushenbury plant and a subsequent expansion which was completed in 1963.

Material Service Purchases Bridgeport Aggregates Inc.

Material Service Corp., Chicago, has purchased the assets of Bridgeport Aggregates Inc., Bridgeport, Tex. Material Service, a subsidiary of General Dynamics Corp., will operate the Texas plant under the name of Metroplex Stone Corp.

G. R. Nagel, senior vice president-sales of Material Service, has been named president of Metroplex. He will continue to make his headquarters in Chicago. Gene C. Marter will become vice president and general manager of Metroplex, and John Halloran has been named plant superintendent. Both will be headquartered in Bridgeport.

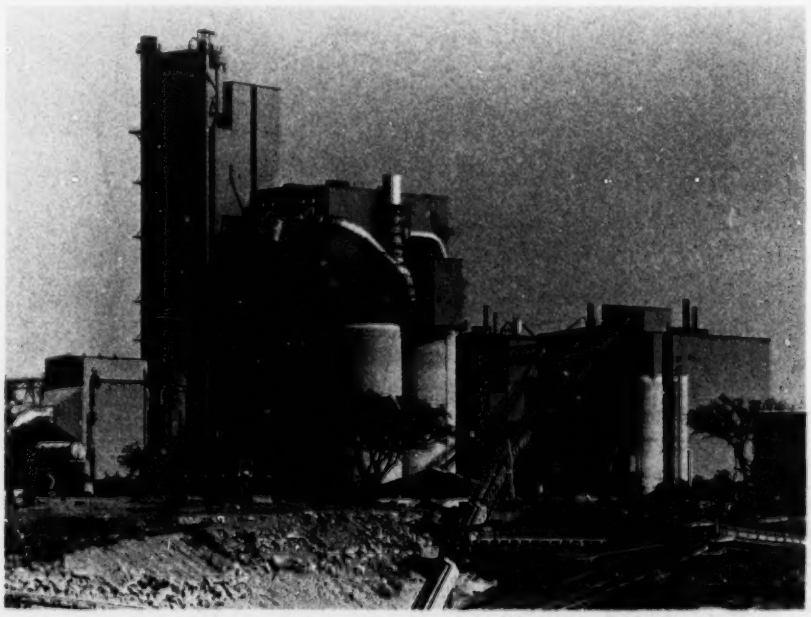
COMPARISON OF MONTHLY/YEAR-AGO CONSTRUCTION CONTRACT VALUES*

	1981 March	1980 March	% Change
Nonresidential Building	$ 5,345.4	$ 4,052.6	+32
Residential Building	5,929.0	4,434.9	+34
Nonbuilding Construction	2,629.8	2,457.7	+ 7
Total Construction	$ 13,904.2	$ 10,945.2	+27
	1981 3 mos.	**1980 3 mos.**	**% Change**
Nonresidential Building	$13,448.1	$11,847.2	+14
Residential Building	14,376.0	12,852.0	+12
Nonbuilding Construction	6,801.9	7,394.0	− 8
Total Construction	$34,626.0	$32,093.2	+ 8

DODGE INDEX
(1972 = 100, seasonally adjusted)

January, 1981 ..... 185 February, 1981 ..... 177 March, 1981 183

**Based on statistics compiled by F.W. Dodge Div., McGraw-Hill Information Systems Co.*



• Marquette Co.'s new $102-million cement plant in Cape Girardeau, Mo., went into production April 27. The 1-million-tpy facility will enable Marquette to service customers throughout the Mississippi, Ohio and Cumberland River valleys. Cement made at the new plant will be barged to Marquette distribution terminals in Nashville and Memphis, Tenn.; Paducah, Ky.; and St. Louis, Mo.

Work injuries summarized in preliminary U.S. Labor report

Table 1.—Number of injuries, injury-incidence rates per 200,000 employee-hours, average number of workers, and employee-hours, by mineral industry and work location, January-December, 1980

Mineral industry and work location	Fatal	Fatal incidence rate	NFDL	NFDL incidence rate	NDL	NDL incidence rate	All occurrences	All incidence rate	Average number of workers	Employee-hours reported
Underground Mines										
Metal	18	.08	2,461	10.27	1,482	6.18	3,961	16.52	27,276	47,949,130
Nonmetal	5	.07	504	6.56	238	3.10	747	9.73	8,858	15,357,508
Stone	—	—	134	6.21	26	1.21	160	7.42	2,296	4,312,595
Total, underground mines	23	.07	3,099	9.17	1,746	5.16	4,868	14.40	38,430	67,619,233
Surface Mines										
Metal	8	.03	958	3.85	556	2.23	1,522	6.11	27,044	49,829,056
Nonmetal	5	.05	288	2.73	181	1.72	474	4.49	12,263	21,103,273
Stone	22	.07	1,352	4.12	552	1.68	1,926	5.88	37,494	65,559,014
subtotal, surface mines	35	.05	2,598	3.81	1,289	1.89	3,922	5.75	76,801	136,491,343
Sand and gravel	15	.05	893	3.06	357	1.22	1,265	4.33	39,562	58,389,372
Total, surface mines	50	.05	3,491	3.58	1,646	1.69	5,187	5.32	116,363	194,880,715
Total, mines	73	.06	6,590	5.02	3,392	2.58	10,055	7.66	154,793	262,499,948
Mills										
Metal	3	.01	1,295	4.20	881	2.86	2,179	7.07	33,674	61,678,996
Nonmetal	8	.04	1,090	4.86	489	2.18	1,587	7.07	24,490	44,901,773
Stone	19	.04	1,957	4.31	785	1.73	2,761	6.09	46,487	90,707,999
Total, mills	30	.03	4,342	4.40	2,155	2.18	6,527	6.62	104,651	197,288,768
Independent Shops and Yards										
Metal	—	—	44	3.44	33	2.58	77	6.03	1,223	2,555,176
Nonmetal	—	—	—	—	—	—	—	—	13	20,934
Stone	—	—	10	4.16	9	3.74	19	7.90	214	481,218
Total, shops and yards	—	—	54	3.53	42	2.75	96	6.28	1,450	3,057,328
All Mines, Mills and Shops										
Metal	29	.04	4,798	5.87	2,952	3.64	7,739	9.55	89,217	162,012,358
Nonmetal	18	.04	1,882	4.63	908	2.23	2,808	6.90	45,624	81,383,488
Stone	41	.05	3,453	4.29	1,372	1.70	4,866	6.04	86,491	161,060,826
subtotal	88	.04	10,093	4.99	5,232	2.59	15,413	7.62	221,332	404,456,672
Sand and Gravel	15	.05	893	3.06	357	1.22	1,265	4.33	39,562	58,389,372
Total, mines/mills/shops	103	.04	10,986	4.75	5,589	2.42	16,678	7.21	260,894	462,846,044
Officeworkers										
Metal	—	—	13	.11	15	.13	28	.24	12,568	23,512,297
Nonmetal	—	—	3	.05	8	.12	11	.17	7,431	13,023,160
Stone	—	—	11	.09	2	.02	13	.11	12,488	23,817,840
Sand and gravel	—	—	10	.23	1	.02	11	.25	6,007	8,744,308
Total, officeworkers	—	—	37	.11	26	.08	63	.18	38,494	69,097,605
Summary Total (includes office-workers)										
Metal	29	.03	4,771	5.14	2,967	3.20	7,767	8.37	101,785	185,524,655
Nonmetal	18	.04	1,885	3.99	916	1.94	2,819	5.97	53,055	94,406,648
Stone	41	.04	3,464	3.75	1,374	1.49	4,879	5.28	98,979	184,878,666
subtotal	88	.04	10,120	4.35	5,257	2.26	15,465	6.65	253,819	464,809,969
Sand and gravel	15	.04	903	2.69	358	1.07	1,276	3.80	45,569	67,133,680
Grand Total	103	.04	11,023	4.14	5,615	2.11	16,741	6.29	299,388	531,943,649

A preliminary report, compiled by the U.S. Department of Labor, Mine Safety and Health Administration, reveals the incidence and severity of worker injuries in the national mining industries for 1980.

Data, presented in a report dated December 1980, were compiled from reports by operators of mines, and deal with personnel directly engaged in production, cleaning, milling, shipping, development, and maintenance and repair work, including direct supervisory and technical personnel, and those involved in contract mining services. These reports are required under the Federal Mine Safety and Health Act of 1977.

The term "injury" includes all reportable occupational injuries and illnesses resulting from a work accident, or exposure, involving a single incident in the work environment. A reportable

(continued on page 107)

Table 2.—Number of injuries by mineral industry, work location, and accident classification, January-December, 1980

Accident Classification	Nonmetal									Stone									Sand and Gravel		
	Underground			Surface			Mills			Underground			Surface			Mills			Surface		
	Fatal	NFDL	NDL	Fatal	NFDL	NDL	Fatal	NFDL	NDL	Fatal	NFDL	NDL	Fatal	NFDL	NDL	Fatal	NFDL	NDL	Fatal	NFDL	NDL
Electrical	—	14	1	—	3	—	—	7	4	—	—	1	3	16	7	4	19	6	3	16	3
Entrapment	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Exploding vessels under pressure	—	1	2	—	1	—	—	8	1	—	2	1	—	3	—	—	3	2	—	4	1
Explosives and breaking agents	1	4	4	—	—	—	—	1	—	—	—	—	2	9	1	—	—	—	—	—	—
Falling, rolling, or sliding material	—	9	2	—	1	1	—	17	6	—	1	—	2	10	3	3	24	6	2	11	3
Fall of face, rib, side or highwall	—	5	3	—	—	—	—	—	—	—	3	1	—	6	1	—	2	—	—	1	—
Fall of roof (underground mines only)	1	21	9	—	—	—	—	—	—	—	8	—	—	—	—	—	—	—	—	—	—
Fire	—	—	2	—	—	—	1	4	—	—	1	—	—	4	4	—	3	1	—	4	1
Handling material	—	152	68	—	96	52	2	466	182	—	36	9	1	437	189	2	685	284	—	323	104
Hand tools	—	54	53	—	34	48	—	81	106	—	17	6	—	157	123	—	259	185	—	109	76
Nonpowered haulage	—	2	—	—	2	2	—	7	2	—	—	—	—	5	1	—	22	7	—	1	—
Powered haulage	—									—											
haulage trucks	—	5	1	1	13	3	—	6	4	—	7	—	1	81	21	1	32	9	2	27	7
front-end loaders	—	7	2	—	3	—	1	14	2	—	—	—	5	26	7	1	13	1	1	19	5
all other powered haulage	—	39	16	1	13	5	2	75	20	—	6	1	2	42	16	2	93	25	3	41	12
Hoisting	1	6	4	—	1	—	—	3	—	—	—	—	—	—	—	—	4	2	—	1	—
Ignition or explosion of gas or dust	—	2	—	2	1	—	—	10	1	—	—	—	1	4	—	1	12	6	1	6	2
Impoundment	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Inundation	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Machinery										—											
dozer	1	2	—	—	2	1	—	1	1	—	—	—	1	8	4	—	2	—	—	4	4
drill	—	3	6	—	4	1	—	—	—	—	3	—	1	20	7	—	—	—	—	1	—
all other machinery	—	78	35	1	27	36	—	74	63	—	16	2	1	137	72	2	217	122	1	99	63
Slips or falls of Person	—	74	17	—	75	22	2	240	62	—	24	5	1	316	66	3	431	88	2	196	46
Stepping or kneeling on object	—	18	5	—	5	2	—	34	1	—	7	—	—	50	22	—	75	19	—	18	10
Striking or bumping	—	2	5	—	1	3	—	13	8	—	1	—	—	11	4	—	14	6	—	3	4
Other	—	6	3	—	6	5	—	29	26	—	2	—	1	20	13	—	47	16	—	9	16
Total	5	504	238	5	288	181	8	1,090	489	—	134	26	22	1,362	561	19	1,957	785	15	893	357

(continued from page 103)

"injury" occurring at a mining operation requires medical treatment, or results either in death, loss of consciousness, the inability to perform all job duties on any workday after the injury, a temporary assignment to other duties, or transfer to another job.

Injury occurrences are classified, according to severity, into three groups as follows: Fatal; NFDL: non-fatal occurrences resulting in workdays lost; and NDL: occurrences with no days lost, resulting in medical treatment other than first aid.

Incidence rates (which represent the number of injuries that occurred for each 200,000 employee-hours worked) are computed by dividing the number of injury occurrences by the number of employee hours and then multiplying the result by 200,000. If the computation is less than .005, an asterisk appears in the chart.

"Average number of workers" represents the number of workers at individual mining establishments during periods (not necessarily continuous) of active operations. ●

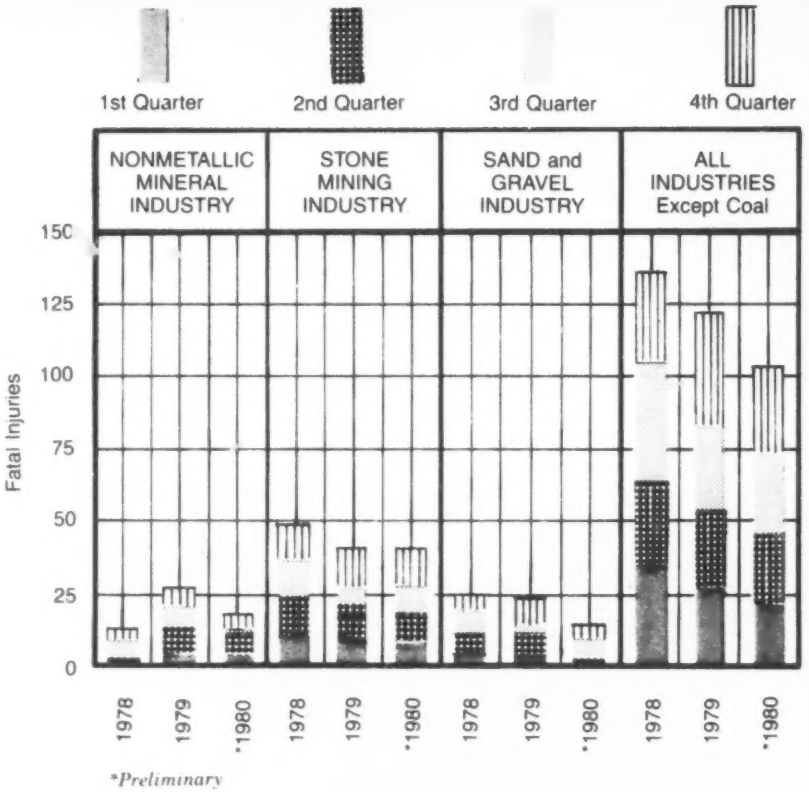
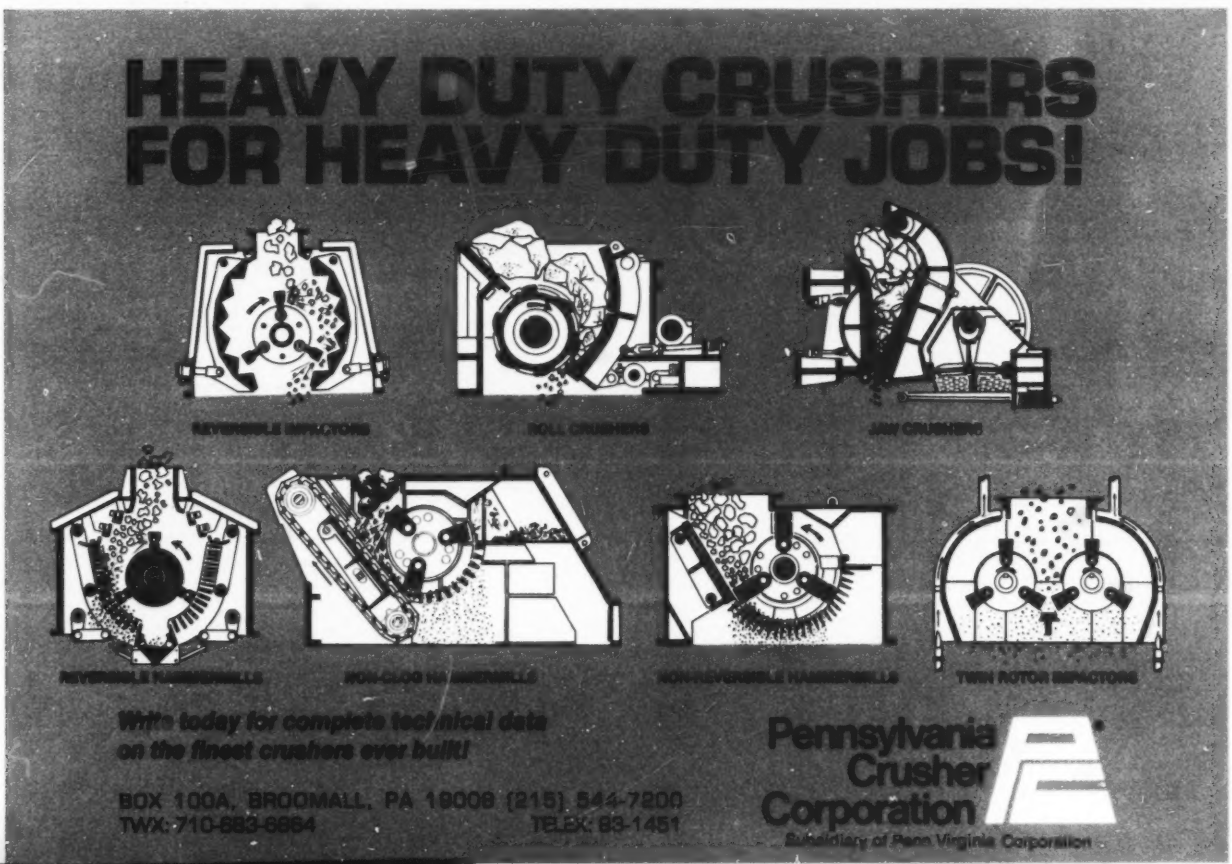


Chart 1.
Number of FATAL INJURIES in the U.S. Mining Industries in each quarter of 1978, 1979 and 1980



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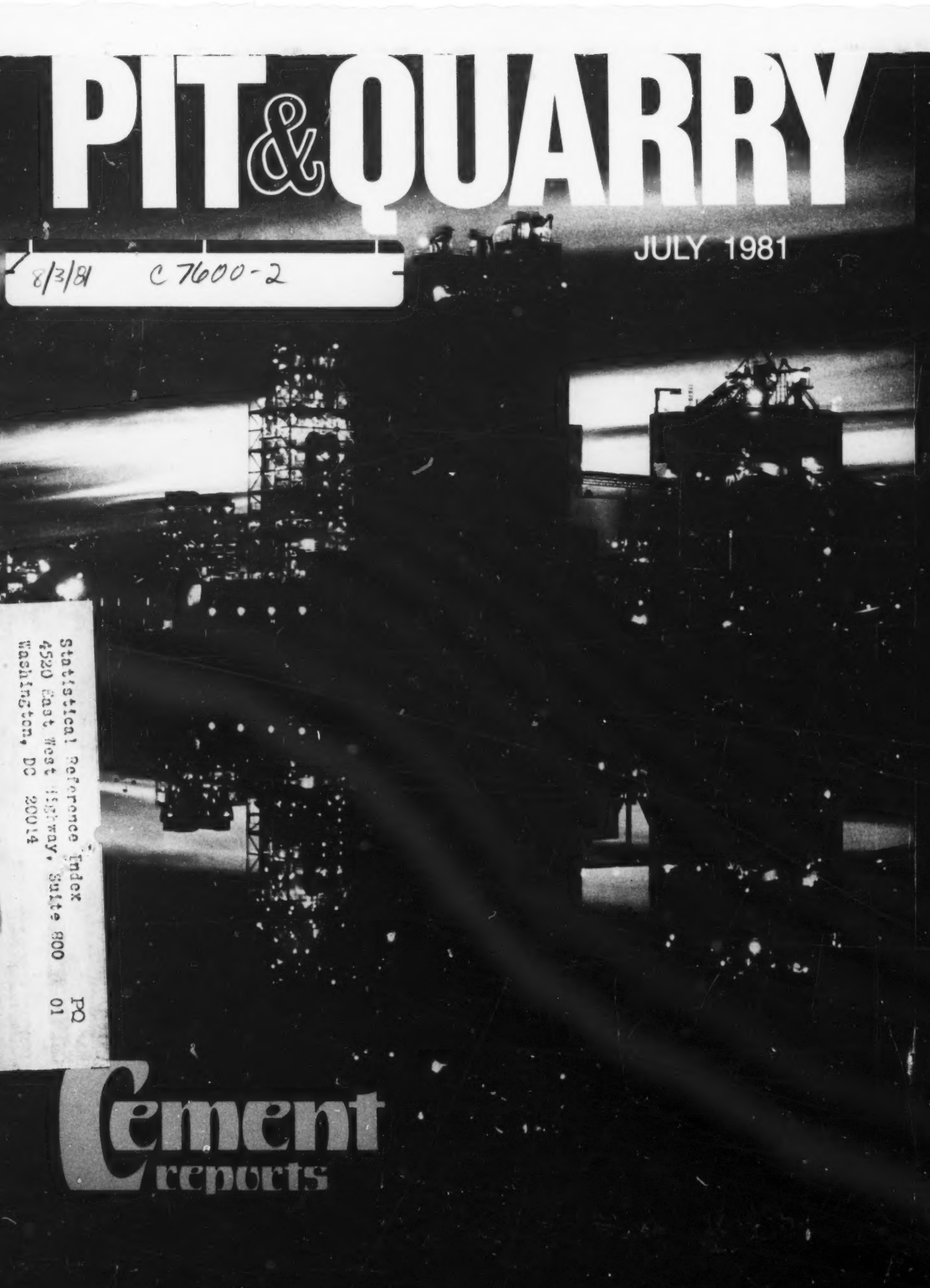

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AND NEXT MONTH

Special reports will feature fuels, their conservation, and fuel-efficient engine oils relative to mobile equipment.

ON THIS MONTH'S COVER

A mirror-image view of General Portland's impressive new Balcones plant at New Braunfels, Tex.; the plant features the first preheater/precalciner kiln system in the firm's extensive chain of cement manufacturing facilities. *Photo courtesy General Portland.*

Errata: The May 1981 Vol. 73 No. 11 issue of Pit & Quarry was identified, on the contents page, as April 1981 Vol. 73 No. 10.

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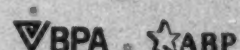

Industry News

New Sales Record Set For 1982 Con/Agg Show

Although the 1982 International Concrete & Aggregates Show is months away, 185 exhibitors have applied for 218,000 net sq. ft. of exhibit space.

"Never before in the 53-year history of the Con/Agg Show has exhibit space been snapped up at so fast a rate," reported Vincent P. Ahearn Jr., exhibit manager. "Our 1980 show was our biggest ever, with exhibitors occupying 233,575 net sq. ft. Yet ten months before that show we hadn't sold as much space as we have now sold for our 1982 show. If the present trend continues, our 1982 show will break all records."

Manufacturers who have not yet signed up for exhibit space are being urged to act promptly. Exhibitor kits were scheduled for mailing early this month. Further information is available from Vincent P. Ahearn Jr., exhibit manager, 1982 International Concrete & Aggregates Show, 900 Spring St., Silver Spring, Md. 20910.

Robert Koch Named LICA Honorary Lifetime Member

The Land Improvement Contractors of America (LICA), presented an LICA Honorary Lifetime Membership award to Robert M. Koch, retired president of the National Limestone Institute. Koch was widely recognized throughout the agricultural and soil conservation communities for his support of the nation's Agricultural Conservation Program. Only five other similar awards have been made in the 30-year history of the LICA.

NSGA Operator's Forum Set for August 9-12

Practical operating topics and plant tours will be the theme of the 1981 Sand and Gravel Operator's Forum Sunday, August 9 through Wednesday noon, August 12, sponsored by the National Sand and Gravel Association. This meeting will be of interest to both aggregate plant operating personnel and sand and gravel executives. The location of the meeting this year is the Toronto-Airport Holiday Inn. Sessions and discussion will be at the hotel, with all day Tuesday devoted to tours of a number of sand and gravel and aggregate operations in Ontario. The Ontario Aggregate Producers Association is organizing the tours.

The Toronto meeting starts Sunday evening with a reception and new products session. The program on Monday includes plant design, crushing, screening material, computerized plant control, and recycling techniques for wash water. Tours of five aggregate operations are scheduled for Tuesday. The concluding session Wednesday morning includes energy conservation, reducing plant downtime, and the economics of equipment maintenance. Further information is available from the National Sand and Gravel Association, Engineering Div., 900 Spring St., Silver Spring, Md., 20910.

Flintkote Stone Products Name Changed to Genstar

Flintkote Stone Products Co. became Genstar Stone Products Co. July 1. Headquartered in Hunt Valley, Md., the Flintkote Co. division became a wholly owned subsidiary of Genstar Limited in early 1980.

Jack A. West, who has served as

COMPARISON OF MONTHLY/YEAR-AGO CONSTRUCTION CONTRACT VALUES*

	1981 April	Seasonally-Adjusted % Change from Previous Month
Nonresidential Building	$ 5,271.6	− 6%
Residential Building	6,569.4	− 4
Nonbuilding Construction	2,537.2	−12
Total Construction	$14,378.2	− 6%

	1981 4 mos.	1980 4 mos.	Cumulative % Change
Nonresidential Building	$18,612.1	$15,720.0	+18
Residential Building	20,979.3	17,191.9	+22
Nonbuilding Construction	9,266.1	10,019.7	− 8
Total Construction	$48,857.5	$42,931.6	+14

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(1972 = 100, seasonally adjusted)

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**Based on statistics compiled by F.W. Dodge Div., McGraw-Hill Information Systems Co.*

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Section cover courtesy: General Portland

Cement report

Cement in the People's Republic of China

BY SID LEVINE

The People's Republic of China apparently has begun a long-term program to upgrade the technological level of its cement industry. The first cement research team to come to the United States from China visited earlier this year several large cement plants, major process equipment suppliers, and the research and development division of the Portland Cement Association in Skokie, Ill. (Fig. 1).

The four-member team visited the United States under provisions of a United Nations fellowship grant. The program was arranged by the U.S. Department of Labor. During their month's stay in March, team members familiarized themselves with the current status of the North American cement industry and studied future trends.

According to a U.S. Bureau of Mines estimate, about 3,000 very small vertical-kiln cement plants, operating in municipalities and communes throughout China, account for more than half of total production. The research team confirmed this estimate and said about 60 wet-process plants (200,000 mtpy or more) currently are in operation. The CEMBUREAU'S "World Cement Directory" lists the location of 35 rotary-kiln plants in China with estimated annual clinker capacities from 100,000 to 1 million mtpy in 1979. (Fig. 2).

Cement production in mainland China amounted to 80 million metric tons last year, according to the study group, making that country the world's third largest producer. (The United States shipped, in 1980, an estimated 69 million metric tons.) Because of the many outmoded vertical kilns scattered throughout the country, the Chinese are concerned about controlling the quality and uniformity of the product. Blending and mixing ce-

Fig. 1 (Left-to-right) Messrs. Chang-Ming Gao, Zu-pei Zhu, Pei Zhang, and Tao-Pkng Li, the four-member team of cement specialists from the People's Republic of China, listen attentively as Douglas V. Parmenter, process simulator trainer-systems engineer at Fuller Co., Bethlehem, Pa., explains how the simulator realistically depicts control room conditions found at an operating cement plant. *(Courtesy: Fuller Co.)*

ments of different grades from various locations can affect the quality of the final product. In addition, the study group noted, China is experiencing a severe cement shortage.

To help relieve this situation, a large cement-development center in Tianjin, approximately 50 miles east of Beijing (Peking), is being built. At present, only a research laboratory has been built, but the entire complex has been planned to include 130,000 sq. ft. of building space. It is expected that 1,000 technicians, engineers, and support personnel will be employed there.

The small-scale, vertical-kiln plants probably were used in China because of the government's development policy rather than for production economics reasons. The policy decentralizes production and creates rural self-sufficiency wherever possible. Such a policy favor small cement plants in rural agricultural areas, financed by capital raised at a regional or commune level, and including equipment built in local workshops by a locally trained work force.

The small plants, because of their low level of technology, are an excellent way to introduce industry and technology into underdeveloped areas. Most of the cement produced by these small plants, however, is poor in quality and suitable only for low-strength agricultural and rural construction projects such as irrigation canals, culverts, houses, farm structures, and concrete poles. The small plants, therefore, contribute greatly to water conservation and rural construction efforts.

The high rate of growth in China's cement industry in recent years has come largely from the rapid expansion of the small-plant sector. In 1964, for example, small plants accounted for only 20% of national output. By 1971, their share had doubled and, by 1976, had jumped to 60% of total production. Small-plant expansion has resulted in an impressive 18.6% average annual rate of increase in small-plant production during the last decade, treble the rate set by the country's modern plants. Average capacity of the small-shaft kilns has been estimated at 10,000 mtpy.[Ref. 3]

Instead of continuing the program to build hundreds of additional small plants, the Chinese apparently are attempting to upgrade the technical level of those already in place. They reportedly have begun to replace vertical kilns with small rotary kilns, thus increasing the output of higher quality cement while using the same amount of raw materials.

The concentration of the cement industry in China is gradually spreading south and west from the heavily industrialized north and east. The bulk of the modern plants traditionally have been located in the northern and eastern regions, but this concentration is shifting to the south. Fragmentary data indicate that the north and east accounted for

Large* (rotary kiln) cement plants in the People's Republic of China

Location Code No.	Plant Location	Estimated Annual Clinker Capacity (metric tons)
1	Hunan, Hopeh	1,000,000
2	Yao Hsien, Shensi	1,000,000
3	Hsiliuli, Hopeh	1,000,000
4	Kweiyang, Kweichow	700,000
5	Tungshan, Hopeh	700,000
6	Liuliu, Peking	700,000
7	Yangchuan, Kansu	650,000
8	Penhsi, Liaoning	650,000
9	Chungking, Szechuan	650,000
10	Weinan, Shensi	500,000
11	Kweisui, Suiyuan	500,000
12	Urh-li (Chengchun), Kirin	440,000
13	Meihekou, Kirin	400,000
14	Yangkuchang, Kiangsu	400,000
15	Liuchow, Kwangsi	400,000
16	Kunming, Yunnan	350,000
17	Urumchi (Ugher) Sinkiang	300,000
18	Kweihwa, Kweichow	300,000
19	Shihlingtzu (Lishu) Kirin	300,000
20	Chaohu (Kohsi), Anhwei	300,000
21	Kungyuan (Penchi), Liaoning	300,000
22	Kaiyuan, Yunnan	270,000
23	Chunghua, Kiangsi	270,000
24	Chiangwan (Shanghai) Kiangsu	250,000
25	Yuchuan, Fukien	200,000
26	Pai-ma, Szechuan	200,000
27	Lien (Dalian), Liaoning	200,000
28	Tsaoz, Shantung	180,000
29	Anshan, Liaoning	100,000
30	Antung, Liaoning	100,000
31	Hsuan, Hopeh-Kiangsi	100,000
32	Loyang, Liaoning	100,000
33	Lien, Honan	100,000
34	Wuchang, Kiangsu	100,000
35	Kienping, Fukien	100,000

*Estimated annual clinker capacities from 100,000 to 1,000,000 metric tons per year, end of 1975.

Source: "World Cement Directory 1980," CEMBUREAU—The European Cement Association (France)

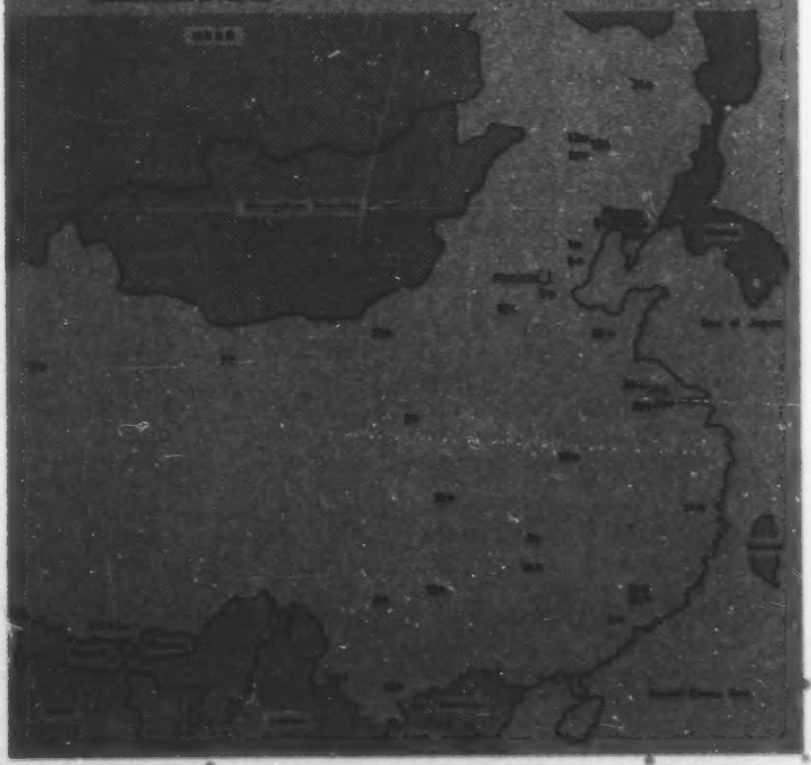

Fig. 2-A & 2-B. Large (rotary kiln) cement plants in the People's Republic of China.

an estimated 56% of national capacity in 1966 and just over 50% in 1975. At the same time, the proportion of national capacity located in the south and southwest jumped from an estimated 35% in 1966 to about 42% in 1975. Sichuan (Szechwan) province in southwest China currently has the largest cement capacity of any province in China, a distinction formerly held by Liaoning province in the northeast.

Modern-plant production has fallen well behind the small-plant sector despite considerable expansion of capacity in the last decade. In 1976, modern plants produced an estimated 20 million tons, or 40% of national output; this represents a decline from the 60% produced in 1971. Output grew at a moderate 6.7% average annual rate in the third Five-Year-Plan (1966-70), but declined sharply to only 4.4% during 1971-76. Lagging modern-plant output directly affects several important sectors of the economy because modern plants supply almost all the better quality cement used in high-priority military projects, heavy industry, and urban housing.

The falloff may be attributed partly to a shift from large rotary kilns, erected in the early part of the expansion program, to much smaller kilns. Contrary to world practices, which favor kilns with capacities of more than 500,000 tons, the Chinese build kilns that average considerably less. The Chinese reportedly have adopted standard-sized rotary kilns of 30,000- to 200,000-ton capacity; the most prevalent new kilns are of the relatively small 60,000-ton capacity.

A shift back to larger-kiln plants began several years ago. As noted in PIT & QUARRY's January 1981 international cement survey,[Ref. 9] China's Technical Import Corp. has awarded contracts for a 2,000-mtpd plant at Xuzhou (1978), a 4,000-mtpd plant at Tangshan (1979), and a 4,000-mtpd plant in Anhui province. Cement plant operations are conducted by the China National Metals and Minerals Import and Export Corp.

China's primary foreign market

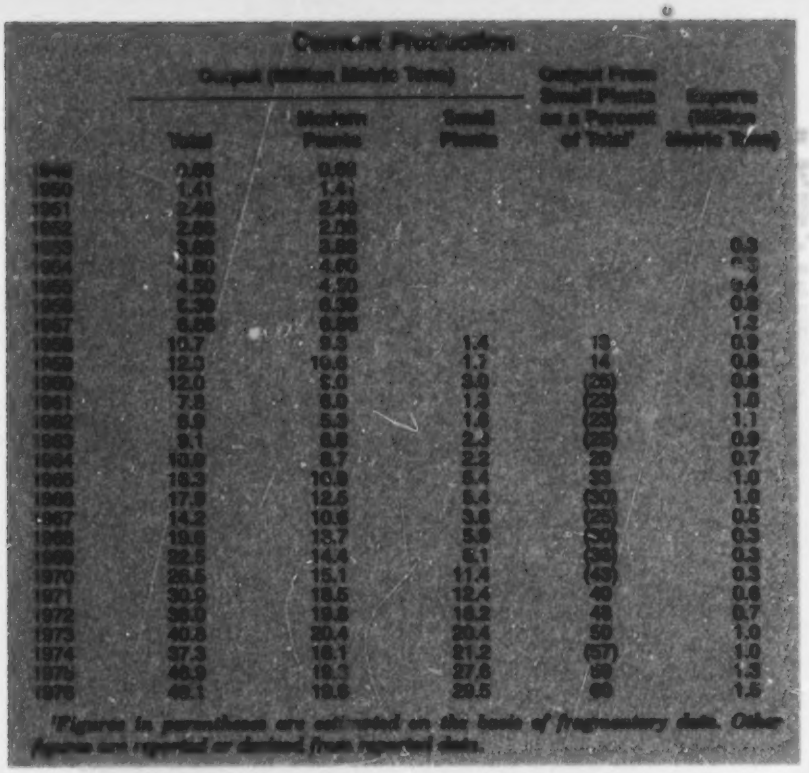

Fig. 3. Cement production in the People's Republic of China: 1949-1976. Reference No. 1

for cement is Hong Kong. All cement needed in this British Crown Colony must be imported, either in the form of finished product, or as clinker which is milled in the colony. The government is a partner in a consortium with Kaiser Cement in the construction of a new cement plant in Hong Kong.[Ref. 4]

Because Kaiser Cement had been actively involved in the cement business in Asia since 1965, the company had studied the prospects of the Hong Kong market for a number of years. Early in 1978, Kaiser learned a major new power plant was to be built through a joint venture of China Light & Power Co. of Hong Kong and a subsidiary of Exxon Corp. Since the power plant would produce a by-product suitable for cement manufacture, and since use of the fly ash by-product would solve a costly environmental disposal problem for the power plant, the idea of a cement-producing plant to serve Hong Kong's expanding construction market was born.

After more than a year of study, planning, and negotiations, China Cement Co. (Hong Kong), Ltd., was founded in mid-1979 to construct and operate a 1.5 million ton cement plant on a waterfront site in the New Territories; the latter is an area of Hong Kong leased in 1898 for 99 years from China by the Crown Colony. The $220-million project, for which the major equipment is on order, is scheduled for completion in mid-1982.

The completion date will approximate that of the adjacent power plant with which China Cement has a long-term supply contract for fly ash. Limestone and other raw materials, along with coal to fuel the cement plant, will be imported.

China Cement is owned by a subsidiary of Kaiser Cement (40%) and by Forward Industrial Co., Ltd., a consortium of prominent Hong Kong investors, and the People's Republic of China (60%). Kaiser International Services Corp., also a subsidiary of Kaiser Cement, has a long-term contract to manage China Cement and to construct and operate the cement plant.

The three partners in Forward Industrial, each with equal interests, are Cheung Kong (Holdings), Ltd., a development company in Hong Kong, Kiu Yip

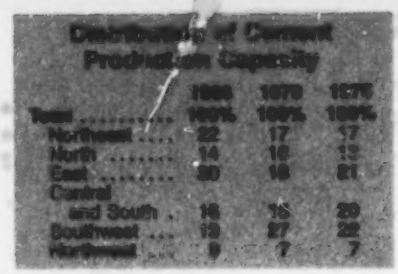

Fig. 4. Distribution of cement production capacity. Reference No. 1

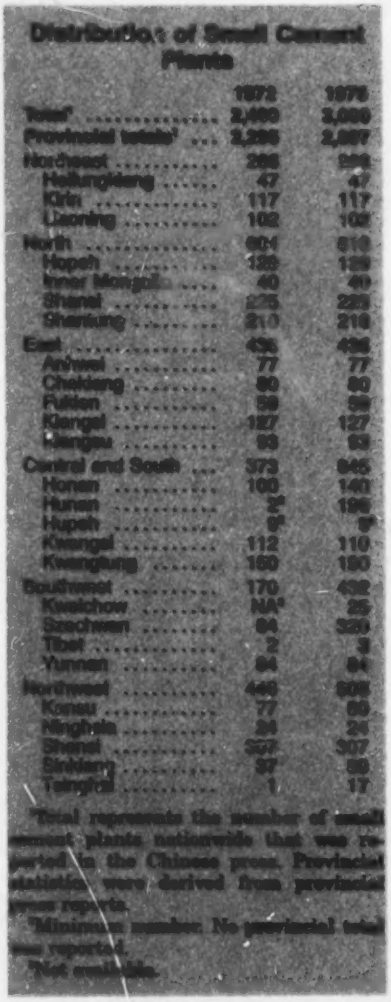

Fig. No. 5. Distribution of small cement plants. (Reference No. 1)

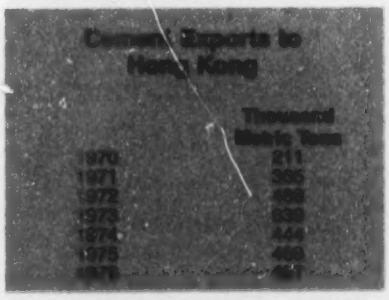

Fig. No. 6. Chinese cement exports to Hong Kong (Reference No. 1)

Plant Visit Itinerary:
Tijeras, N.M. plant, Ideal Basic Industries, Inc.
Ragland, Ala. plant, National Cement Co.
Knoxville, Tenn. plant, Ideal Basic Industries, Inc.
Theodore, Ala. plant, Ideal Basic Industries, Inc.
Cape Girardeau, Mo. plant, Marquette Cement Co.
New Braunfels, Tex. plant, General Portland, Inc.
Manufacturers' Seminars:
Fuller Co., Catasauqua, Pa.: Training program to familiarize study group with research conducted into raw materials, chloride testing, grate clinker-cooler design, preheater and precalcining systems and related processes.
Allis-Chalmers, Milwaukee, Wisc.: Training program for study of advances in cement technology, cement testing, use of low grade raw materials, alkali bypass design, and other relevant manufacturing processes.
Portland Cement Association, Skokie, Ill.
Program included sessions on the association's research and development projects in cement technology and involved discussions with technical specialists.

Visit of the cement research team of the People's Republic of China (March 1981). Sponsored by the United Nations, Department of Technical Co-operation for Development. Program arranged by the United States Department of Labor, Bureau of International Labor Affairs.

Study Group Participants:
Pei Zhang, President of Modernization, Ministry of Building Materials Industry.
Tao-Pking Li, Director and Vice Chief Engineer, Cement Development Center, (projected institute of cement industry).
Chang-Ming Gao, Engineer in Charge, Cement Development Center, (projected institute of cement industry).
Zu-Pei Zhu, Chief Engineer, Cement Development Center, (projected institute of cement industry).
Team Escort: Aly Mousse Afify, Chairman, Alexandria Cement Co., Egypt.
Visit Objective: Study cement technology including the following:
(a) present status and development trends of the cement industry in the U.S.A.
(b) organization and management of cement development centers, their activities, and how the activities relate to the manufacturing sector.
(c) testing methods on the characters of cement raw material and coal;
(d) use of low grade raw material in the RSP (precalciner system), the alkali by-pass and the homogeneous technique for raw materials.
(e) use of industrial wastes as cement raw materials.

Fig. No. 7. Program for visit of cement research team of the People's Republic of China to the United States (1981).

Investment Corp. Ltd., which is controlled in Beijing (Peking), and Green Island Cement Co., Ltd., currently the principal importer and distributor of cement to the Hong Kong market. ●

REFERENCES

1. "China's Cement Industry," Publication No. ER 77-10704, November 1977, National Foreign Assessment Center, Central Intelligence Agency.
2. Visit of Cement Research Team of the People's Republic of China, March 1981. Study group sponsored by the United Nations. Program arranged by the United States Department of Labor, Bureau of International Labor Affairs.
3. "Appropriate Technologies for Small-Scale Production of Cement and Cementitious Materials," R.J.S. Spence, Department of Architecture, University of Cambridge, Great Britain, pages 74-97, in "Appropriate Industrial Technology for Construction and Building Technology, "Monograph on Appropriate Industrial Technology No. 12, United Nations Development Organization, New York, 1980.
4. 1979 and 1980 Annual Reports, Kaiser Cement Corp.
5. "World Cement Directory: 1980", CEMBUREAU—The European Cement Association (France.)
6. "The International Cement Scene: Plant and Production Update, 1981," Sid Levine, Pit & Quarry, January 1981.

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U.S. cement: shortages and $100/ton product

Industry prosperity in the 1980s, but exactly for whom?

Cement report

BY ROY A. GRANCHER
vice president, marketing
Dyckerhoff Inc.,
Atlanta, Ga.

The 1980s have gotten off to a rather slow start in terms of portland cement shipments. Nevertheless, industry observers are "bullish," predicting a level of demand that will cause the decade to rank as one of the best ever in industry history.

The Portland Cement Association's forecast for the period 1980-1985 says "the U.S. portland cement industry appears to be entering the best five-year period in its history." The chairman of one of the largest manufacturers projects "the 1980s will be the golden decade of the cement industry," and the chairman of the industry's largest firm sees cement consumption growing so rapidly that it will far outstrip the industry's ability to produce it. Cement is expected to become a "gray gold," essential in nature to the nation's future.

Recovery becoming short supply, and product prices pushed to $100 a ton levels—this should be ample bullishness to satisfy any cement executive.

Down—but in demand

The U.S. cement industry's unimpressive entrance into the 1980s has been characterized by shipments that are down by almost 11%, or by more than 9 million tons. The year's 76 million total rank it on a par with volumes of the late 1960s. Certain states have been hit hard with 25 to 30% drops (Utah, Iowa, New Hampshire, Michigan); in North Dakota, shipments fell by approximately 40%. With such dismal results recorded, it is no wonder the industry's return on net worth also fell, to 15% vs. the more than 19% achievements of the preceding 2 years.

Meanwhile, the import faucet, particularly the clinker portion, turned down dramatically in 1980. Total tonnage dropped 44% to 5.3 million; clinker imports were down by almost 60%. Major suppliers, such as the United Kingdom, Japan, and Canada, experienced sizable reductions. Million-ton markets of the year before (like the Detroit, Los Angeles, and Seattle customs districts) were down to one-half or one-third their former size.

Can this be the calm before the storm of cement demand? Quite probably. Cement shipments are projected to reach 90 million tons by 1985 and to stand at more than 100 million by the end of this decade. During these years that all important and underlying factor for cement growth—increased concrete usage—certainly will be present.

Concrete will capture an expanding market share in the U.S. battle of construction materials. Concrete takes less energy to make and put in place than other materials serving the same building function. Inherent energy-saving characteristics will encourage increased use of concrete for numerous construction purposes. Relative low cost, first cost competitiveness, and energy cost effectiveness are definite advantages.

Less than 10 years ago, escalating energy prices became part of the American experience. As the country continues to react to a high-energy cost economy, the energy efficient material will dominate in construction practice. That material is concrete. One could say the United States is a developing nation in terms of its cement/concrete potential.

In the short term, will the

Representative of major industry effort to modernize and add to capacity is the new $94 million Balcones, Tex. plant of General Portland. Production began at the 925,000 ton coal-fired facility in December 1980. Balcones incorporates the latest in preheater/precalciner technology, the requirement for efficient cement production in the 1980s. Thirteen percent of cost of construction went into systems and equipment to protect the environment. Dyckerhoff Zementwerke A. G., Wiesbaden, served as advisors on the design and start-up operations of the plant.

All new technology characterizes Lone Star's expansion and conversion to coal at Santa Cruz, Calif. The dry process plant features a preheater tower, a 13 × 184 ft. short kiln, and flash precalcining. At 775,000 tons, the operation will have nearly twice its former production capacity with little more than half of its former unit energy consumption. A mid-1981 completion date will add to Lone Star's ability in servicing the San Francisco Bay area and other northern California markets.

"glue" be available to hold the opportunity together? Equally significant, in the longer term, will changed components of concrete necessitate its availability? Both answers can be *no*, and therein can lie the course of the decade.

Clinker constraint

There will be cement shortages during this first half of the 1980s. Capacity data, industry programs, and cost factors support that contention. Construction sector recovery—through revised credit policies and/or personal adjustment to those higher levels—can bring 80-plus to 90 million ton shipment years. Industry finish capacity stands at more than 100 million tons. However, it is in clinker capacity that cement shows its constraint. For 8 years, this capacity has remained at or near 90 million tons. Despite substantial modernization and new additions, the *net clinker tonnage*, after replacement and after industry plant closings, has stayed at a plateau.

This pattern continues to influence the outlook through 1985. Although a total of 12 million tons of additional gross capacity is indicated, clinker capacity, after kiln retirements and other closings that can take place, could increase by only some 6 million tons.

Built-in operating problems are predicted for several plants presently coming onstream. One company's ambitious plans, already announced, may have severely overextended its resources. Certain projects, reported under evaluation or seeking capital, must be rated as only gleams in the corporate eye. The size of the investment required to turn on an efficient cement operation (in interest burden alone) has become prohibitive. A recent plant study showed that a $100 million investment would reduce the operation's gross profit by half. Yet, because of tremendous differences in operating costs among plants, due to age and process, this spending must be made, or else.

Last December, a major brokerage firm lowered its investment rating on cement stocks. The firm had concluded that "long term cement prospects (while still appealing) may not be as ebullient as some forecasters have predicted." Last year's 15% returns surely will not create a rush to addition. A story is told about the East Frisians, a people situated off the coast between Holland and Germany. They are quite rustic in their ways, and considered by some as not being very bright. Yet their native intelligence was amply attested to when a vacationing cement executive, observing that their location would be excellent for his type of business, was told: "Don't think that we are that stupid as to want to build a cement plant."

Price of a gamble

The U.S. cement industry's traditional shift, in response to previous short supply, continues. Volume generally has been added to the south and west of the Mississippi. For a while, Texas has become the state with the largest capacity. (Next year, it will be California.) Yet the biggest cement reaction, and gamble, of the 1980s is dependent on a demand that may not materialize.

The nation's $30 billion MX-missile system offers great promise to the strategically-placed cement producer. But current controversy and debate can wash out this demand. At one point, the MX was the generator of wild consumption figures—35 million tons at an early stage. Then 10 to 17 million tons were projected. Present revised estimates place tonnage at a more believable level of up to 3 million tons. Initially, this expected demand was to be concentrated in two states; then, due to other factors considered adverse, there was a desire to broaden the area. Now, the bottom-line uncertainty is that an entirely different defense plan can win support for MX deployment; the missiles could be based at sea. Several committed cement companies find themselves with a crucial stake in the decision.

The large capital expenditures for plant modernization and addition have to be pushed through the system and felt in price increases. Advancing prices also must reflect the risk of investment and the tying up of these sizable amounts of capital in cement manufacture. During the 1970s, Bureau of Mines data indicate cement prices per ton went up some 165%. This represents an increase from $18 a ton, upon entering the decade, to nearly $47 a ton at the end. Yet this gain yielded double-digit returns only over the last 4 years.

Can cement reach $100 a ton as predicted? By every logical measure of economic justification, conceivable concept of managerial practice, and by just plain need, they should. The inflationary spiral has created new highs in every facet of daily living—from prime rates to mortgages to filling up the gas tank. No wonder these are the new numbers of our way of life and of our business.

Cement has every right to cost more—quite a bit more. As the industry rides again into an extremely tight supply situation, its product price—like everything else—will escalate.

International traders

The scenario then for the decade's first half will include shortages and higher prices. But reaction will come into play spurred by what went before. This response also will have a direct bearing on the fortunes of cement producers. One factor will be the

Cement's Difference in a Decade—1970 to 1979
(As reported in Bureau of Mines minerals yearbook)

	1970	1979	Data for 1980
Number of active plants	181	164	will show that there are yet fewer plants and fewer kilns in the industry, with more of those remaining being dry process, of larger capacity, and on coal.
Number of clinker plants	169	157	
wet process	106	89	
dry process	63	61	
both	—	7	
Number of kilns	478	377	
Average capacity (000 tons)	495	575	
Fuel: coal, with alternates	57%	85%	

growth of international trade group activity. Another will be a significant move to blended cements.

Although imports were cut to the bone last year, the impact generally was felt on the purchasing done by cement firms (i.e. clinker). Meanwhile, a basic change was taking place as to who in the future might be doing the importing. The discovery, in the 1970s, of the United States as a cement market was made by major manufacturing export sources; this decade can see the movement of cement as a bulk commodity in international trade.

Developments in California underscore the trend. A major finished cement facility is built by America's leading raw materials trader and Spanish interests. In the port of Stockton, a new 30,000 ton terminal is sponsored by a German group with Japanese bulk carriers supplying production. At Redwood City, controversy rages between consultants over a cement terminal there. One study, conducted for Indonesia's largest cement firm (who want to import in participation with other Asian countries), says the tonnage would ease spot shortages that have plagued the state. The other consultant says these findings do not reflect adequately current industry capacity expansions, and that to rely on demand from politically uncertain projects—such as a canal, a dam, or the MX-missile—is "unwise."

A similar pattern is emerging in Texas while other states may receive the same type of attention. Indeed, it is interesting to note that cement plant modernization and capacity addition have been at their greatest in Texas and California. A confrontation between the domestic capacity and coastal imports can lead to a competitiveness detrimental to the profit need of the industry.

Blended opportunity

Can this be the decade of blended cements? This is a question several companies are answering in the affirmative.

The potential exists, as never before, for the use of differing components in concrete. That initial short supply of cement and those $100 per ton prices can only act as a spur for a move, in the 1980s to blended cement. Mandate, governmentally encouraged use, industry and product recognition, and customer choice will reinforce the speed of acceptance. Cement producers could well end up with their greatest opportunity of this decade: to provide more fully for the needs of their customers in the concrete industries.

How rapidly this move takes place will depend, not only on shortages and high prices, but on how and by whom these materials are provided. What has taken place, and is taking place elsewhere in the world with slag and fly ash, will have a distinct bearing on blended cement development in this country.

Let's look at a basic. Cement's growth is directly related and tied to increased concrete work. Concrete has to win its battle of construction materials against steel, aluminum, glass, asphalt, etc. for all segments of the cement and concrete industries to enjoy the 1980s.

Quality concrete must be the goal in the competitive construc-

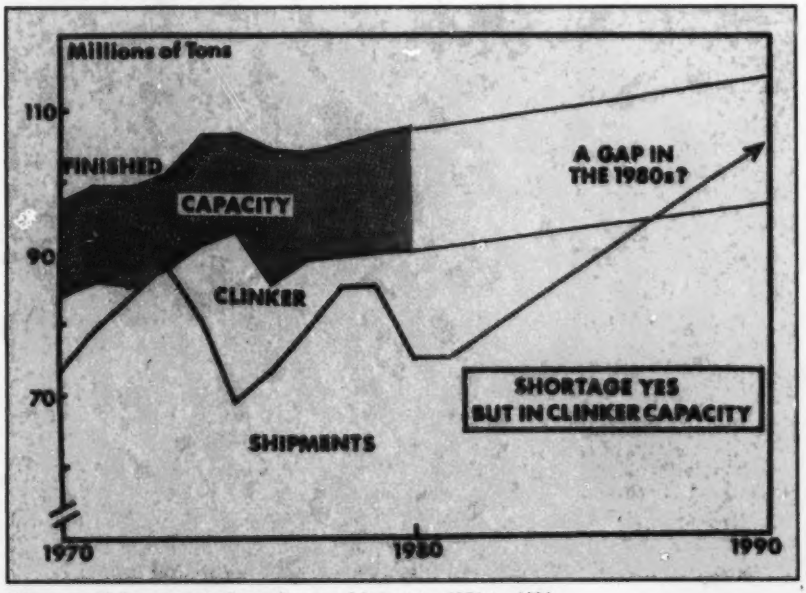


Figure 1. U.S. cement: Capacity vs. shipments, 1970 to 1990.

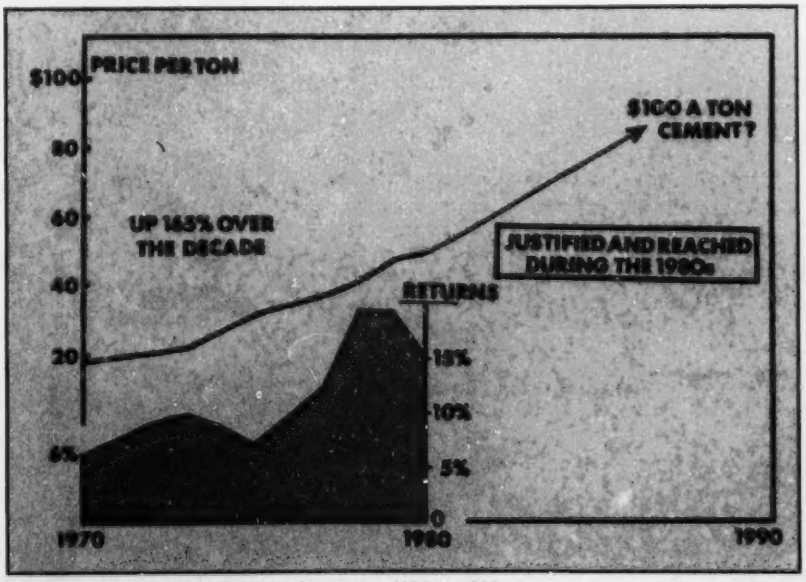


Figure 2. U.S. cement: Price and returns, 1970 to 1990.

tion materials marketplace. One of the most foolhardy things this industry could do is to look at the short term and achieve a product cost reduction to the detriment of the end product. Realizing the opportunities of the 1980s calls for the best possible concrete. It behooves the cement producer to see to it that quality concrete is the material supplied to the market.

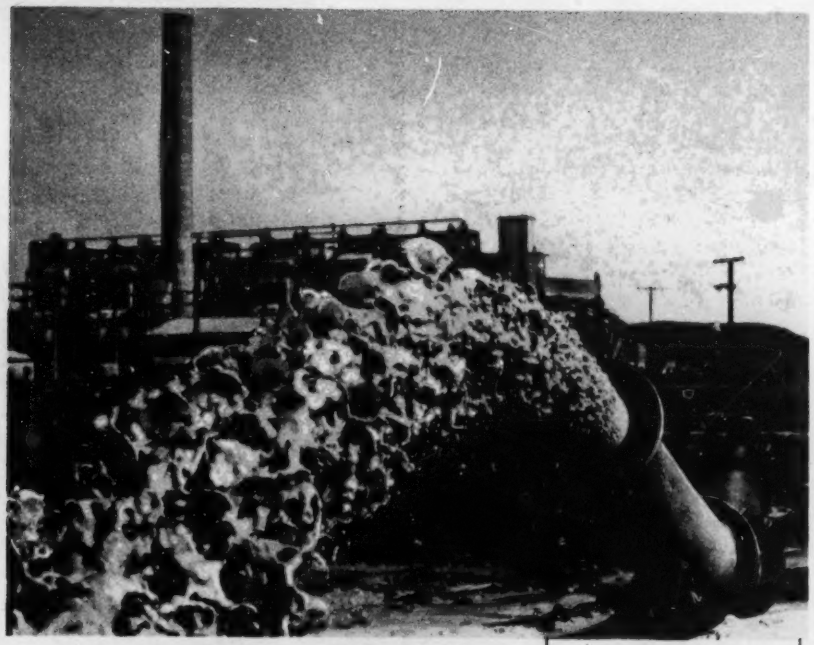
Undoubtedly, points of view will differ, but the fundamentals of quality concern, the logic and experience of intergrinding, the continual testing of mix in plant and market, the controlled production from the nation's relatively few cement plants vs. the varied outputs of thousands of concrete operations—all this certainly should mean the manufactured approach. The very idea of an "Age of Concrete" can be destroyed if the quality factor is neglected.

Which business for the decade?

Cement industry prosperity in the 1980s depends on how successfully the industry meets and participates in the different demand patterns presented by each half of the decade. The "right" moves for the first half may be the "wrong" ones for the second. The requirement is an overlap of short term strategy with long range objectives and a clear definition of exactly what business a firm feels it is in.

If all are part of the cement/concrete industries, and if the cement producer functions as the raw material supplier to those who market that flexible, inexpensive, quality building product, then the course of action becomes obvious. Extension of traditional lines includes a place for blended cements. There are those who have termed cements of slag and fly ash the "Hamburger Helpers" of the '80s; they may prove to be the industry's "Steak Tartare."

The industry's bullishness is not unfounded. However, it will call for a blend of factors that include enlightened attitudes to the new, determination to make it come about, and preservation of the "Golden Goose" of quality concrete upon which so much of tomorrow depends. ●



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Annual financial reports round-up

Cement and aggregates revenues reflect construction activities

BY SID LEVINE

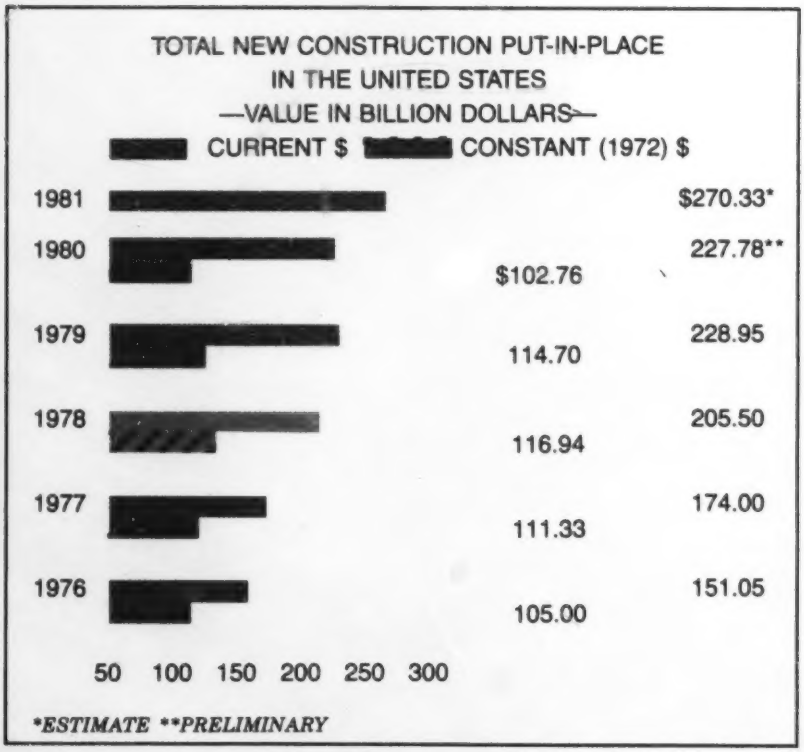
Mixed economic results in 1980 and guarded optimism about 1981's outlook for the cement and related construction minerals industries were recorded in 1980 annual reports. High interest rates, high inflation, and increased tax burdens were blamed for current conditions in the construction minerals markets.

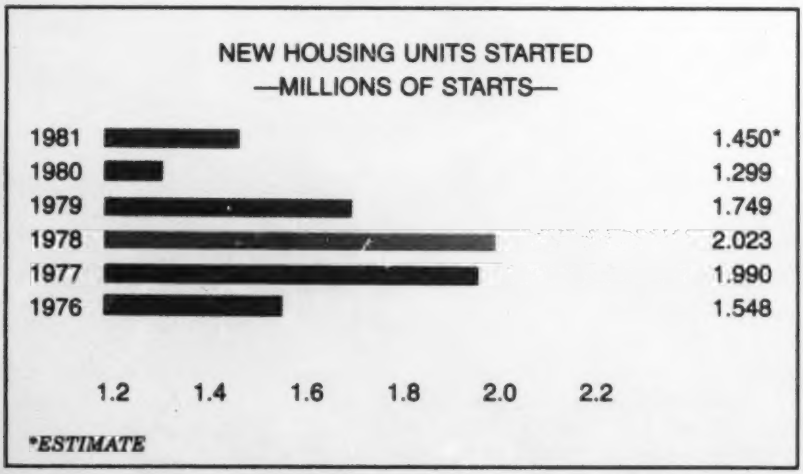
Minerals, mineral products designated "construction minerals," and average percentages of their use in construction are: portland cement, 100%; masonry cement, 100%; calcined gypsum, 100%; expanded clay, shale, and slate, 100%; iron blast furnace and steel slag, 98%; sand and gravel, 97%; pumice, 87%; crushed stone, 75%; exfoliated vermiculite, 65%; dimension stone, 60%; expanded perlite, 35%; crude gypsum, 30%; fly ash, 13%; and lime, 6%.

Five-year sales figures for construction minerals producers and a brief outline of their lines of business are given in this survey of 1980 annual reports.* Industry production data, corporate realignments and new establishments, and a tabulation of North American cement company production for 1980 also are provided in this annual Pit & Quarry financial report.

First quarter reports indicate a better than usual level of construction minerals sales for the first three months of 1981. This is attributed to construction activity in the abnormally mild winter

**For year ended December 31, except as noted.*





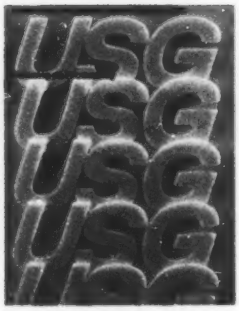
weather. Traditionally, these early, interim financial reports show low sales for cement, concrete, and construction aggregates because of normal weather-related sluggishness in construction.

The physical volume of new construction, put-in-place in the United States, declined in 1980 about 10% from 1979 but is expected to recover in 1981 by about 8%. The current dollar value of new construction remained virtually constant from 1979 to 1980 despite a 10% increase in prices. Based on constant (1972) dollars, the 1980 change in new construction value was a 10% drop from 1979. Although the value of new construction is expected to rise 18% in 1981 to about $270 billion, more than half the increase will simply reflect higher input costs.

Construction contracting in 1981 is expected to total $164.5 billion, about 12% above the actual amount spent in 1980, according to a recent update of the "1981 Dodge/Sweet's Construction Outlook," issued last October by McGraw-Hill Information Systems Co. Residential building for this year is expected to reach $76 billion, a 20% gain over 1980, with housing starts estimated to reach 1.45 million units compared with 1.3 million in 1980.

Cement

Portland cement shipments from plants in the United States dropped in 1980 to an estimated 76.5 million short tons, about 8.3% less than the 83.4 million tons shipped in 1979. The 1981

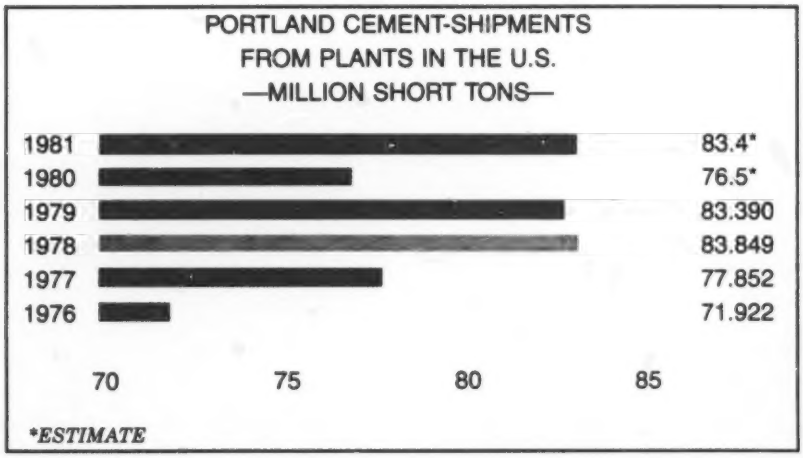


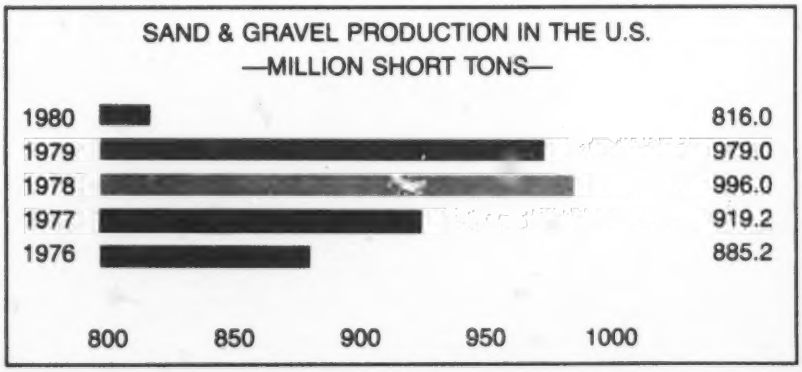
forecast of a 9% increase would bring the quantity shipped to around 83.4 million tons. Shipments from mills (plants) include: cement ground from clinker manufactured in kilns in the United States and Puerto Rico: cement ground from imported clinker; cement imported and distributed by domestic producers only.

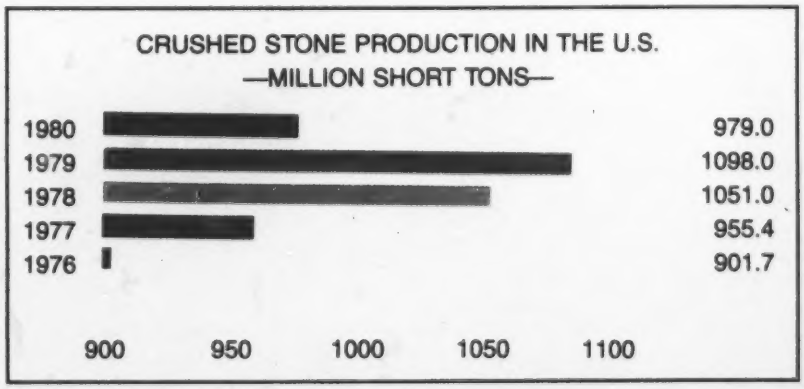
In 1980, cement clinker was made domestically by 55 companies and one state agency operating 168 plants in 39 states and by two companies operating two plants in Puerto Rico. Estimated total value for 1980 portland cement shipments is $4.1 billion compared with $3.86 billion in 1979. Cement and clinker imports in 1980 were estimated at 5.7 million short tons compared with 9.4 million tons in 1979.

Portland cement shipments in 1980 by type of customer were: 67% to the ready mixed concrete industry; 14% to producers of concrete products, such as concrete block, concrete pipe, and precast and prestressed concrete; about 8% to building materials dealers; 9% to highway and other contractors; and the remaining 2% to various buyers including government agencies.

Studies indicate that about 30% of cement consumption usually goes into residential construction, 22% into private industrial and commercial building, 7% into public building, 18% into public works, 18% into transportation (highways, railroads, mass transit), and 5% into other construction. Shipments of masonry cement in 1979 totaled 3.8 million







short tons and were valued at $205 million.

The cement industry's three major problem areas continue to be capacity and capacity utilization, energy conservation and conversion, and air pollution control regulations. All these areas will involve sizable capital expenditures, and it may be difficult for many producers to generate the needed funds. Capacity utilization is important to producer profits and to the ability to raise capital.

Another factor that influences the amount of capacity available is the huge cost of building a new plant or making a major addition such as a new kiln. A completely new plant, using the energy-conserving preheater dry-process technology and having the required air pollution control equipment, can cost $125 million or more for a facility with an annual capacity of 1 million tons. In addition, regulatory approvals (federal, state, and local) can take as long as 2 years to secure. About 2 more years are needed to build the plant, and maybe another year to get it into full operation.

The cement industry is one of the most energy-intensive industries. Energy costs range from about 30% of total production costs for an efficient plant to more than 50% for the usually older wet-process operation. In the next 15 to 20 years, huge capital expenditures will be required to purchase the dry-process equipment that uses preheater or other energy-saving technology. Major energy-conservation gains can be made only by closing old plants and building new ones or by replacing kilns which are by far the largest and most costly pieces of cement-making equipment. The industry presently has a shorter-range program to convert most production facilities to coal-fired or coal-backup systems by the early 1980s.

The industry's capital requirements also are increased by the need for existing plants to meet air pollution regulations. These regulations were a factor in some kiln- and plant-closing decisions in the 1970s. Although the bulk of these expenditures already has been made, additional funds will be required in the next few years. The total cost of meeting air pollution standards for a cement plant is sizable. About 20 to 25% of the cost of building a new plant is for emission control equipment; when the equipment is in place, it adds to operating expenses.

The volume of cement shipments from U.S. mills is expected to rise at a compound average annual 3.4% rate between 1980 and 1985 bringing total shipments to almost 90 million tons by 1985. High demand in the mid-1980s, depending on geographic patterns, could result in shortages. This again would draw in more imports—if cement is available in the world market—and spur the need for greater industry capacity.

Concrete

Ready mixed concrete: The demand and output patterns of the ready mixed concrete industry (SIC 3273) are very similar to those of the cement industry. On a year-to-year basis, ready-mix producers purchase about 66 to 67% of total cement shipments. The value of industry shipments in 1981 should be about $10.7 billion. This is a 16% increase from the $9.2 billion shipped in 1980 and represents a 6% volume rise.

This industry is characterized by a large number of small firms that serve local markets. In 1977, there were about 4,300 companies with 5,400 establishments. Most plants were very small; only 1,400 had 20 or more employees. Most (about two-thirds) were dry-batch plants; almost a quarter were central-mix operations; and about 10% were portable mixing facilities.

A 3.4% compound average annual rise in volume of shipments for the ready mixed concrete industry is forecast for the 1980-85 period. This not only anticipates higher levels of construction activity in 1985 compared with the recession-plagued 1980 market, but also a small increase in market share for poured-in-place concrete at the expense of other types of non-concrete construction.

Concrete block and brick: In 1980, the value of shipments declined 2% to about $1.5 billion on a volume drop-off of 13%. An 8% gain in volume is expected in 1981 for concrete block and brick production (SIC 3271). The value of shipments should reach almost $1.8 billion, an 18% rise from 1980. Contributing to this increase are a gain in housing starts and higher levels of office building activity.

This industry, like the ready-mix industry, has very localized markets with shipments within 100 miles of the plant and usually much closer. In 1977, about 1,275 plants were operated by more than 1,160 companies. Only about 350 of these plants had 20 or more employees. The trend in this industry is toward fewer, and larger, more modern facilities. More than 300 fewer plants were in operation in 1977 than in 1967.

Based on the favorable outlook for new housing and nonresidential buildings in 1985, the volume

(continued on page 144)

"Outlook

In 1981, the American economy will sail on largely uncharted seas, with high levels of interest rates and of inflation offering no historical precedent for those analysts who would project the course of economic activity. Further clouding the forecast are the changing economic and fiscal philosophies being brought into prominence by the transition in Washington.

Such indicators as interest rates, business capital spending, and unemployment trends point toward a potential recurrence of recession. An early-1981 peak in interest rates followed by a moderate decline in those rates would benefit conditions in many of our end markets. Any federal initiatives to stimulate capital formation would further increase the likelihood of improvement in those end markets and would favor a general resumption of economic growth."

This excerpt from the Koppers Co. 1980 annual report is representative of similar expressions of uncertainty concerning 1981's economic environment that appeared in most of the annual reports listed in this P&Q review.

(continued from page 136)

of concrete block and brick shipments should rise at a 3% compound average annual rate between 1980 and 1985.

Other concrete products: The concrete products, N.E.C. industry (SIC 3272) consists of firms that produce a variety of concrete products such as pipe, precast and prestressed concrete products, and bagged dry mixes. The major market for these products is nonresidential construction except for dry mixes which mainly depend on residential additions, alterations, and repairs.

In 1980, the value of shipments increased 3% to $4.05 billion based on a 7% reduction in volume. The value of industry shipments in 1981 should reach $4.65 billion, up 15% from 1980. The volume increase will be an estimated 5%.

The number of companies and establishments in this industry has been rising; in 1977, about 3,500 firms operated more than 3,900 plants. In 1967, there were less than 3,100 companies and about 3,400 plants. Less than 900 of the plants in 1977 had 20 or more employees.

Long-term prospects for this industry are favorable. Contractors are turning to factory-built components and building systems to improve quality control, reduce seasonality, speed up the on-site erection process, and, in some cases, to save money. The bridge replacement program expected in the 1980s should stimulate the demand for prestressed concrete units. Between 1980 and 1985, the volume of shipments by the concrete products N.E.C. industry should grow at a compound average annual rate of 3.7%, the fastest rate for any of the cement and concrete product industries.

**North American Cement Company Capacities*
(as of December 31, 1980)**
In million short tons

Clinker	Cement	United States Company
8.210	8.958	Lone Star Industries, Inc.
5.527	6.055	Ideal Basic Industries
5.216	5.987	General Portland Inc.
4.787	5.255	Gifford-Hill Co.
4.781	5.043	Lehigh Portland Cement Co.
4.706	4.776	Martin Marietta Corp.
3.559	3.745	Kaiser Cement and Gypsum Corp.
3.222	3.480	Dundee Cement Co.
3.176	3.540	National Gypsum Co.
2.862	3.553	Medusa Corp.
2.846	3.550	California Portland Cement Co.
2.823	2.980	Southwestern Cement
2.614	3.526	Marquette
2.361	2.630	Missouri Portland
2.085	2.765	Texas Industries, Inc.
2.073	2.530	Louisville Cement Co.
1.790	2.094	Penn-Dixie Industries Inc.
1.663	1.710	Moore McCormack Cement Inc.
1.525	1.750	Alpha Portland Industries
1.492	1.792	Certox Corp.
1.488	1.550	Atlantic Cement
1.248	1.306	Ash Grove Cement Co.
1.148	1.150	River Cement Co.
1.128	1.605	Oregon Portland Cement Co.
1.098	0.[illegible]10	The Monarch Cement Co.
.984	1.002	Coplay Cement
.957	1.220	Columbia Cement Co.
.906	1.100	South Dakota Cement Plant
.902	1.150	Northwestern States Portland Cement Co.
.854	0.800	National Cement
.848	0.950	Arkansas Cement
.840	1.240	The Flintkote Co.
.790	0.855	Giant Portland and Masonry Cement Co.
.765	0.790	The Whitehall Cement Manufacturing Co.
.750	0.750	Citadel Cement
.700	0.757	Hercules Cement Co.
.696	1.125	Monolith Portland Cement Co.
.581	0.625	Keystone Portland Cement Co.
.517	0.625	Rinker Cement
.508	0.690	Alamo Cement Co.
.338	0.355	Capitol Aggregates Cement
.330	0.800	Gulf Coast Cement
.289	0.300	SME Cement Inc.
.228	0.300	Cyprus Hawaiian Cement
		Canada Company
5.169	6.972	Canada Cement Lafarge
3.484	4.326	St. Lawrence Cement
2.234	3.022	Inland Cement Ind. Ltd.
1.786	1.753	St. Marys Cement Ltd.
1.390	.750	Lake Ontario Cement
.924	.744	Miron Inc.
.340	.529	Ciment Quebec Inc.
.143	.279	North Star Cement Ltd.
.106	.110	Federal White Cement

Source: Market and Economic Research Dept., Portland Cement Association, "U.S. and Canadian Portland Cement Industry: Plant Information Summary," Dec. 31, 1980

Includes gray and white cement plants. Does not include grinding-only facilities.

Aggregates

Sand and gravel: An estimated total of 816 million short tons of sand and gravel, valued at about $2.3 billion, was reported sold or used in the United States in 1980. Construction sand and gravel constituted 97% of the uses, and industrial applications accounted for the other 3%. Construction allocations were 43% for aggregate for portland cement concrete; 15% for asphaltic concrete aggregate; 24% for road bases and coverings; 16% for fill; and 2% for railroad ballast, snow and ice control, etc. Demand for sand and gravel is forecast to increase at an annual rate of 1.1% for the next 5 years.

Crushed stone: Output of crushed stone in 1980 is estimated to be 979 million tons, valued at $3.2 billion. About 75% of production was used for construction including dense-graded road-base stone, concrete aggregate, road stone, cement, bituminous aggregate, etc. Demand for crushed stone is expected to grow at an annual rate of 2%.

(continued on page 148)

Corporate Changes in the U.S. Cement Industry: 1979-1981

Formerly	Acquired		Now
Amcord, Inc.	1979	by	Gifford-Hill & Co., Inc.
Hercules Cement Co. (Amcord/Gifford-Hill)	1981	by	U.S. Cement Co. (subsid. IFI International, Italy)
Flintkote Co., The	1980	by	Genstar Limited, (Canada)
Kosmodale, Ky. plant (Flintkote/Genstar)	1980	by	Moore McCormack Resources, Inc.
Glens Falls, N.Y. plant (Flintkote/Genstar)	1980	by	Moore McCormack Resources, Inc.
OKC Corp.	—		Liquidation plans announced in 1980
Pryor, Okla. plant (OKC Corp.)	1980	by	Lone Star Industries, Inc.
New Orleans, La. plant (OKC Corp.)	1980	by	Lone Star Industries, Inc.
Penn-Dixie Industries, Inc.	—		In 1980, filed for protection under Chapt. 11 of the Federal Bankruptcy Act
West Des Moines, Iowa plant (Penn-Dixie)	1981	by	Martin Marietta Corp.
Kingsport, Tenn. plant (Penn-Dixie)	1981	by	Dixie Cement Co. (subsid. Moore McCormack Resources)
Richard City, Tenn. plant (Penn-Dixie)	1981	by	Dixie Cement Co. (subsid. Moore McCormack Resources)
Nazareth, Pa. plant (Penn-Dixie)	1980	by	Coplay Cement Co. (subsid. Societe des Ciments, Francais, France)
Petoskey, Mich. plant (Penn-Dixie)	1981	by	Dundee Cement Co.
West Winfield, Pa. plant (Penn-Dixie)	1981	by	Penn-West Cement Co., Inc.
Portland Cement Co. of Utah	1979	by	Lone Star Industries, Inc.
Florida Mining & Materials Corp.	1979	by	Moore McCormack Resources Inc.
San Antonio Portland Cement Co.	1979	by	Presa S.P.A. Cementerie di Robilante, Italy and Cementwerke Vigier AG, Switzerland.
River Cement Corp. (subsid. Missouri Pacific Corp.)	1979	by	IFI International SA, Italy
Universal Atlas Cement (div. United States Steel)	1980	by	Heidelberger Zement AG, W. Germany
Whitehall Cement Manufacturing Co.	1981	by	General Portland Inc.
McDonough Co.	1981	by	Hanson Industries, Inc. (subsid. Hanson Trust Ltd., London)
National Gypsum Co., Cement Div.	—		National Gypsum Co. (ended talks with General Dynamics Corp. for acquisition of Cement Div.)
Dixon, Ill. plant of Medusa Cement Corp.	1980	by	Lone Star Industries, Inc.
New Orleans, La. plant of Lone Star Industries (divestment)	1980	by	Citadel Cement Corp. (subsid. Canada Cement Lafarge Ltd., Canada)

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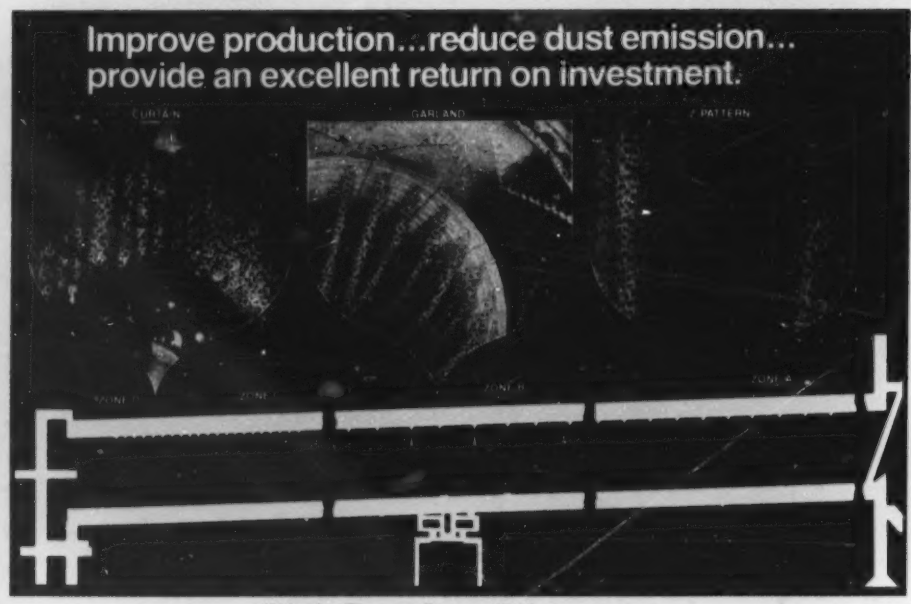

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THYSSEN

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Kaiser Cement Market Summary (Amounts in Thousands, Except Percents)	U.S.	Total Kaiser Markets	Pacific Southwest	Texas	Northwest	Rocky Mountains	Hawaii
Demographic Data							
1980 Population	226,505	51,453	27,186	14,228	7,163	1,911	965
Net Migration[1]	—	408	204	111	71	14	4
Population Growth[1]	.9%	1.9%	1.8%	2.2%	1.9%	1.4%	2.1%
1980 Households	79,361	18,234	10,018	4,690	2,585	680	281
Household Growth[1]	2.0%	2.9%	3.0%	2.9%	2.9%	2.7%	3.0%
Construction Data							
Housing Starts[1]	1,715	502	259	148	69	14	12
Contract Awards[1] [2]	85,380	22,310	10,969	6,093	3,641	988	599
Cement Data (tons)							
1980 Shipments	76,944	23,034	10,223	9,004	2,357	1,075	375
Share of U.S. market		29.9%	13.3%	11.7%	3.1%	1.4%	.5%
Average Shipments[1]	80,814	21,053	10,159	7,300	2,201	976	417
Share of U.S. market		26.1%	12.6%	9.0%	2.7%	1.2%	.5%

(1) Annual average from 1970 to 1980. (2) Millions of 1972 constant dollars.

Kaiser Cement Corp.'s plants serve five primary geographic areas: the Pacific Southwest (California, Arizona, and Nevada), Texas, the Northwest (Washington, Oregon, and Alaska), the Rocky Mountains (Montana, Wyoming, and North Dakota) and Hawaii. The relationship between national demographic and construction data and the company's share of the cement market is shown in this tabulation from Kaiser Cement's 1980 annual report.

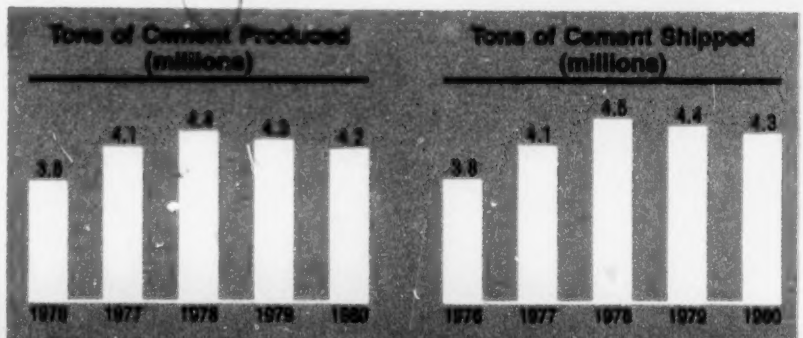
Dimension stone: Production of dimension stone in 1980 was estimated at 1.21 million tons and valued at $123 million. Demand is estimated to increase at an annual rate of 1%.

Slag: About 27 million tons of iron and steel slags were sold or used in the United States in 1980 with a total value of $100 million FOB. Construction uses accounted for nearly all the output, including incorporation of the slag into road bases, fill, asphaltic concrete aggregate, and portland cement concrete aggregate.

Pumice and volcanic cinder: Mine production of pumice and volcanic cinder in the United States amounted to an estimated 4.652 million tons in 1980. Total estimated value of the amount sold or used was $20 million. The major uses of pumice and volcanic cinder combined were for road construction (45%) and concrete aggregates and admixtures (40%). Demand for the next 5 years is expected to increase at an annual rate of 4%.

Perlite: Processed perlite produced in 1980 was estimated at 635,000 short tons and valued at $16.6 million. Crude ore came from 13 mines operated by 11 companies in 7 western states. The ore was expanded by 45 companies at 79 plants in 33 states. Demand for perlite is expected to increase at an annual rate of about 2.8%. In 1980, 45% of production was used for insulation board, plaster, and concrete aggregate.

Vermiculite: Mine production of vermiculite sold or used in the United States in 1980 was estimated at 339,000 tons and valued at $24.3 million. Most of the crude vermiculite was shipped to 47 exfoliating plants in 30 states. The major uses for exfoliated vermiculite were: insulation, 31%; lightweight concrete aggregate, 23%; plaster and cement aggregate, 13%; and agriculture, 31%. Demand for vermiculite is expected to increase at an annual rate of about 3%.



Costs of Goods Sold			
Year ended December 31,	1980	1979	1978
Cement			
Wages and benefits	20%	21%	20%
Freight on shipments	14	14	14
Fuel	13	14	15
Maintenance, excluding labor	12	14	12
Power	8	7	7
Purchased raw materials	7	8	8
Depreciation and depletion	5	4	4
Property taxes and insurance	4	4	4
Total cement	83	86	84
Concrete, Aggregate and Fly Ash	15	13	13
Real Estate	2	1	3
Total costs of goods sold	100%	100%	100%

Allocation of costs for General Portland's production of construction minerals is shown in this tabulation from the company's 1980 annual report.

Gypsum

Output of crude gypsum mined in the United States in 1980 was estimated at 12.1 million tons and

valued at $93 million. Imports, including anhydrite, amounted to 7.4 million tons. Apparent consumption (crude gypsum + by-product gypsum + imports − exports + industry stock adjustment) amounted to 20.2 million tons. Of the total supply of crude gypsum (including 800,000 tons of by-product gypsum), 13.6 million tons was calcined for gypsum products, and 5 million tons was used mainly as a cement retarder or as agricultural land plaster. The calcined gypsum was sold as prefabricated products or as plaster. Sales of gypsum for cement use was 3.3 million tons. Demand for gypsum is expected to increase at an annual rate of about 2.5%.

Lime

Construction uses accounted for 9% of the estimated 18.1 million tons of lime produced in 1980. The construction applications include soil stabilization, mason's lime, and finishing lime. Demand for lime is expected to increase at an annual rate of about 2.5%.

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Fly ash

This by-product of electrical energy generation in coal-fired power stations can be considered the sixth most abundant solid mineral resource in the United States. About 13% of an estimated 50 million short tons of fly ash collected in 1979 was used in construction applications.

Fly ash use as a construction mineral includes incorporation in Type 1-P cement; mix with raw material for producing cement clinker; lightweight aggregate; stabilization and roads; fill for roads, reclamation, and ecology dikes; and filler in asphalt mix.

REFERENCES

"1981 U.S. Industrial Outlook for 200 Industries with Projections for 1985"—U.S. Dept. of Commerce, January 1981.

"Mineral Commodity Summaries: 1981"—Bureau of Mines, U.S. Dept. of the Interior.

"U.S. and Canadian Portland Cement Industry: Plant Information Summary,"—Market and Economic Research Dept., Portland Cement Association, Dec. 31, 1980.

"Mineral Industry Surveys," (various), Bureau of Mines, U.S. Dept. of the Interior.

"Portland cement: production and project survey," Sid Levine—Pit and Quarry, January 1981.

Financial reports roundup

ALPHA PORTLAND INDUSTRIES, INC.

Cement & aggregates—net sales

	In millions	% of total sales
1980	$ 90.395	34.4%
1979	101.596	42
1978	88.071	39.3
1977	75.811	37.4
1976	71.498	31

Lines of business: Production and sale of portland cement and construction aggregates from four cement and two aggregate plants; heavy construction, including tunnel construction, pile driving, and subsurface construction; and mechanical contracting.

AMERICAN AGGREGATES CORP.

(year ended March 31)

Aggregate business—net sales

	In millions	% of total sales
1981	$48.221	84.2%
1980	58.429	88.7
1979	52.388	89.7
1978	41.013	89.9
1977	31.217	85

Lines of business: The corporation is engaged primarily in the business of mining, processing, and selling sand, gravel, and limestone and slag aggregates.

Consolidated subsidiaries are engaged in hydraulic dredging of inland waterways and in the manufacturing and sale of precast concrete products and prestressed concrete building units.

ARMCO INC.

Mineral resources—net sales

	In millions	% of total sales
1980	$140.2	2.5%
1979	78.3	1.6
1978	83.4	1.9
1977	62.8	1.8
1976	97.5	3.1

Lines of business: Oil field equipment and production; fabricated metal products; carbon steel products; specialty steel products; mineral resources (coal, iron ore, limestone, lime); industrial products and services; and financial services. Limestone mining and lime production are conducted at the Black River Lime Co. quarry and plant at Carntown, Ky.

ARUNDEL CORP., THE

Aggregates—net sales

	In millions	% of total sales
1980	$25.795	49.6%
1979	23.332	49.6
1978	18.877	42.3

Concrete—net sales

	In millions	% of total sales
1980	$26.010	50 %
1979	20.790	44.2
1978	17.973	40.3

Lines of business: Construction materials production (sand, gravel, stone, blast furnace slag aggregates, ready mixed concrete, prestressed/precast concrete, brick); and real estate.

ASARCO INC.

Lines of business: Production of nonferrous metals, including silver, copper, lead, zinc; production of nonmetallic minerals, including asbestos, coal, ilmenite, and limestone; smelting of nonferrous metal ores; scrap metal recycling; specialty chemical production; solar energy systems; and asbestos-cement pipe manufacture.

American Limestone Co., a division of Asarco, markets in seven states, mostly in the Southeast, the products from five stone quarries, two sand and gravel plants, one transit-mix concrete plant, and three limestone plants that process the by-product limestone from Asarco's Tennessee zinc mines.

BETHLEHEM STEEL CORP.

Net limestone production

	Million short tons	% consumed by Bethlehem's operations
1980	3.7	98%
1979	4.8	98
1978	4.6	97
1977	4.4	98
1976	4.6	88

Lines of business: Bethlehem is an integrated steel producer engaged primarily in the manufacture and sale of steel and steel products. The company also engages in marine construction, including the building and repairing of ships and the building of mobile offshore oil drilling platforms and in the manufacture of plastic products.

Incidental to its steel business, Bethlehem is engaged in the mining of ore and coal and the quarrying of limestone chiefly for its own use; the transportation of ore, coal, and limestone on the Great Lakes, and of bulk commodities between foreign ports and the United States, and the operation of short-line railroads in the vicinities of its plants.

Mineral products include iron ore, manganese ore, metallurgical and industrial bituminous coal, anthracite, lime, metallurgical, commercial, and agricultural limestone, slag, mineral wool, asphaltic concrete, copper concentrates, bentonite, and rutile.

BLOUNT, INC.

(fiscal year ended last day of February)

	In millions	% of total sales
1981	$486.834	74.8%
1980	361.658	65.3
1979	318.708	74.8
1978	295.225	78.1
1977	267.249	80.3

Lines of business: Construction, agribusiness, and specialty steels. The aggregate division of the construction segment mines and processes sand, gravel, and limestone in Michigan.

CALIFORNIA PORTLAND CEMENT CO.

(year ended April 30)

Cement Division—revenues

	In millions	% of total revenues
1980	$172.6	80.8%
1979	152.4	76.6
1978	122.8	82.5
1977	92	82
1976	70.6	74.7

Concrete & Stone Products Division—revenues

	In millions	% of total revenues
1980	$37.9	17.7%
1979	38.8	19.5
1978	22.8	15.3
1977	19.4	17.3
1976	21.6	22.8

Lines of business: Portland cement, coal, prestressed/precast concrete products, ready mixed concrete, aggregates, limestone, oil, and natural gas.

CANADA CEMENT LAFARGE LTD.

Sales

	In millions
1980	$711.1
1979	618.3
1978	535.3
1977	439.7
1976	384.8

Lines of business: Cement, aggregates, ready mixed concrete, precast/prestressed concrete, concrete block, concrete pipe, asphalt, and construction.

CECO CORP., THE

Concrete forming services & products—net sales

	In millions	% of total sales
1980	$122.381	28.1%
1979	103.5	24.7
1978	82.2	24.1
1977	63.2	23.7
1976	62.9	25.3
1975	71.7	27.7

Lines of business: Concrete forming services and products (installation of forming work for concrete buildings; manufacture of concrete pipe, block, and prestressed concrete sections); steel mill products; fabricated building products; and door products.

CONROCK CO.

Total revenues

	In millions
1980	$131.565
1979	139.358
1978	111.684
1977	97.730
1976	81.745

Lines of business: The company is engaged in multi-unit aggregate and ready mixed concrete operations in southern California. Products include rock, sand, and gravel for concrete aggregates; rock, sand, and gravel for special commercial uses; ready mixed concrete; sand for plastering, gunite, and masonry; crushed rock for streets, highways, and asphaltic concrete; road construction base; rock dust for streets, highways, and asphaltic concrete; cobbles for river work and flood

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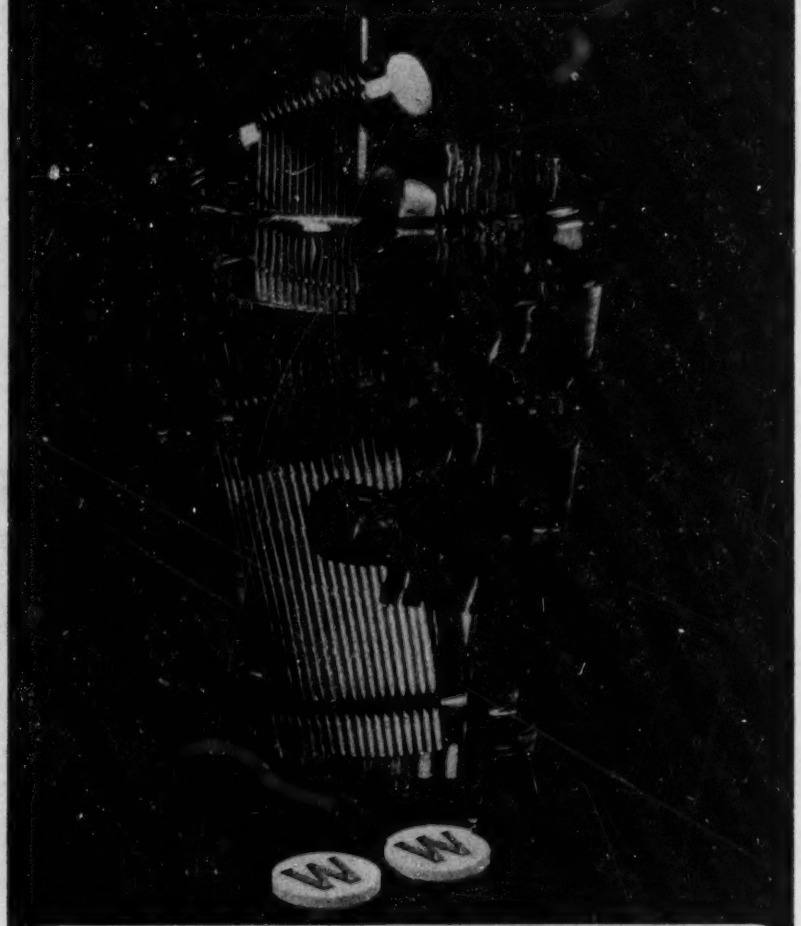

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control work; ballast for railroads; asphaltic slurry seal coat mixes; and nursery sand for golf courses and landscaping.

CONTINENTAL MATERIALS CORP.

Minerals and mineral products—revenues

	In millions	% of total revenues
1980	$14.353	34.2%
1979	13.086	40.4
1978	10.588	39.2
1977	7.940	34.2
1976	5.179	29.7

Lines of business: Minerals and mineral products segment—production of sand, gravel, limestone, ready mixed concrete, copper ore. Building components and supply segments—manufacture of heating, cooling, and ventilation equipment and of hollow metal doors.

DENISON MINES LTD.

(corporate headquarters: Toronto, Ont., Canada)

Cement & cement products*—sales

	In millions	% of total sales
1980	$89.35	24.5%
1979	88.32	28.4
1978	78.36	29
1977	64.64	32.5
1976	54.85	34.3

Minerals (uranium, limestone products, oil & gas)—sales

	In millions	% of total sales
1980	$275.81	75.5%
1979	222.19	71.6
1978	191.53	71
1977	134.42	61.5

Lines of business: Production of uranium, oil, gas, potash, coil, cement, limestone, lime, kaolin, silica sand, feldspar, etc.

**This is the company's Lake Ontario Cement Ltd. division. See separate listing under Lake Ontario Cement.*

DRAVO CORP.

Natural resources segment—revenues

	In millions	% of total sales
1980	$233.6	21 %
1979	214.5	21.6
1978	164.1	17.1
1977	130.6	13.8
1976	107.9	13.3
1975	92.7	11.3

Lines of business: Dravo operates within five segments—engineering construction, manufacturing, natural resources, equipment, and transportation.

The Natural Resources Group's products include sand, gravel, lime, limestone, ready mixed concrete, concrete block, coal, and

power plant scrubber sludge stabilizer. Southern Industries Corp. division produces shell, sand, gravel, slag, stone, ready mixed concrete, asphaltic concrete, concrete block, lime, poultry feed supplement, and filler material for industrial rubber products.

ENGELHARD MINERALS & CHEMICAL CORP.

Nonmetallic minerals—revenues

	In millions	% of total sales
1980	$195.2	0.7%
1979	177	1
1978	155.4	1.5
1977	130.9	1.8
1976	107.4	1.6
1975	80.9	1.4

Lines of business: Marketing of ferrous and nonferrous minerals and metals, ferro-alloys, crude oil and oil products, fertilizers, petrochemicals, sugar, grains, and other raw materials; refining of precious metals and manufacture of products containing precious metals; mining and processing of nonmetallic minerals, including kaolin, attapulgite, bauxite, and talc.

FLORIDA ROCK INDUSTRIES, INC.

(year ended September 30)

Aggregates—net sales

	In millions
1980	$59.935
1979	48.151
1978	33.759
1977	23.811
1976	16.800

Concrete products—net sales

	In millions
1980	$103.336
1979	88.995
1978	65.224
1977	53.196
1976	51.188
1975	53.419

Net sales by product—% of contributions to net sales

	Ready mixed concrete	Construction aggregates	Other concrete products & building materials
1980	47%	34%	9%
1979	48	33	10
1978	47	30	10
1977	50	26	9
1976	55	20	10

Lines of business: The company has three major segments—construction aggregates, concrete products, and transportation. The construction aggregates segment principally produces and sells sand and crushed stone. The concrete products segment manufactures and markets ready mixed concrete and concrete block and markets other building materials.

GENERAL DYNAMICS CORP.

Material Service and Resources Group—net sales

	In millions	% of total sales
1980	$520	11 %
1979	577	14.2
1978	471	14.7
1977	437	15.1
1976	421	16.5

Lines of business: Military and commercial aircraft; missiles and space systems; commercial ships; building minerals and products; telecommunications and data products, etc.

The building materials and resources group includes these company segments: Material Service Corp. (stone, sand, gravel, ready mixed concrete, concrete pipe); Marblehead Lime Co. (high-calcium lime, dolomitic lime); Freeman United Coal Mining Co.; and Asbestos Corp. Ltd.

GENERAL PORTLAND INC.

Cement & related products—net sales

	In millions	% of total sales
1980	$307.1	98.3%
1979	274.3	99
1978	240.1	97.6
1977	197.6	99.5
1976	180.6	99.8

Net sales by product (percentages are approximate)

	1980	1979	1978
Cement	83%	86%	85%
Ready mixed concrete	7	7	7
Aggregate	7	5	4
Fly ash	1	1	1

General Portland Inc. is one of the nation's largest manufacturers of portland cement, operating a network of nine plants—three in Texas, two in Florida, and one each in California, Ohio, Tennessee, and Kansas. General Portland also markets construction aggregates in Texas and Louisiana, fly ash in Texas, and ready mixed concrete in the Dallas/Fort Worth area. Real estate makes up the remainder of the company's sales—2% in 1980; 1% in 1979; and 3% in 1978.

GENERAL SHALE PRODUCTS CORP.

Net sales

	In millions
1980	$46.170
1979	61.751
1978	66.630
1977	54.120
1976	45.352

Lines of business: Face brick, concrete block, ready mixed concrete, masonry and concrete sand, and burned lightweight aggregate.

GENSTAR LTD.

Cement and lime revenues

	In millions of Canadian dollars	% of total revenues
1980	$360.6	15.6%
1979	182.1	14.4
1978	159.2	13.9
1977	133.6	13.6
1976	127.9	15.6

Concrete, aggregates & construction services—revenues

	In millions of Canadian dollars	% of total revenues
1980	$609.3	26.4%
1979	460.2	36.4
1978	391.2	34.2
1977	383.1	39.1
1976	358.3	43.6

Building supplies—revenues

	In millions of Canadian dollars	% of total revenues
1980	$608.4	26.3%
1979	39.9	3.2
1978	32.1	2.8
1977	21.1	2.2
1976	16.6	2

Lines of business: Cement, lime, ready mixed concrete, concrete block, concrete pipe, sand, gravel, classified aggregates, lightweight aggregates, precast concrete structural and architectural components, precast concrete railway ties, gypsum wallboard, resources recovered from solid waste, and construction asphalt; housing and land development; construction; marine activities; and financial services and investments.

GEORGIA-PACIFIC CORP.

Gypsum—net sales

	In millions	% of total sales
1980	$196	4%
1979	229	4
1978	203	5
1977	160	4
1976	117	4

Lines of business: Building products, including plywood and specialties, lumber, gypsum, roofing, metal products, etc.; pulp, paper, and paperboard; chemical and plastic products; furniture; stationery products; and industrial gypsum, etc.

GIANT PORTLAND & MASONRY CEMENT CO.

Net sales

	In millions
1980	$27.227
1979	30.212
1978	28.284
1977	20.428
1976	18.348

Lines of business: Production of portland and masonry cements at 855,000-tpy plant in South Carolina.

GIFFORD-HILL & CO., INC.

Cement—net sales

	In millions	% of total sales
1980	$201.860	36 %
1979	52.158	12.9
1978	43.280	12.7
1977	32.788	11.2
1976	26.273	9.9

Concrete—net sales

	In millions	% of total sales
1980	$81.951	14.6%
1979	80.178	19.8
1978	72.009	21.2

Aggregates—net sales

	In millions	% of total sales
1980	$45.358	8.1%
1979	40.891	10.1
1978	33.036	9.7

Concrete pipe—net sales

	In millions	% of total sales
1980	$34.725	6.2%
1979	34.041	8.4
1978	33.785	9.9

Lines of business: Cement, sand, gravel, crushed stone, slag, fly ash, ready mixed concrete, concrete pipe, concrete chemicals, asphaltic concrete, metal building products, irrigation products, concrete block, machine tools, transportation.

GULF + WESTERN INDUSTRIES, INC.

(year ended July 31)

Building products—net sales

	In millions	% of total sales
1980	$146	2.74%
1979	136	2.57
1978	108	2.51
1977	89	2.44

Cement—net sales

	In millions	% of total sales
1980	$142	2.66%
1979	148	2.80
1978	140	3.25
1977	123	3.37

Lines of business: Gulf + Western activities are reported in the following business segments: leisure time; consumer and agricultural products; manufacturing; apparel products; automotive replacement parts; natural resources and building products; and financial services. Main products of the Natural Resources and Building Products Group are portland and masonry cement, zinc metal and zinc pigments, titanium dioxide and other chemicals, and metallurgical coal. Cement operations are conducted by G + W's Marquette Co., operating 10 plants in nine states. The building products segment encompasses aggregates and ready mix.

IDEAL BASIC INDUSTRIES, INC.

Cement Division—sales and operating revenues

	In millions	% of total sales & operating revenues
1980	$353.187	77 %
1979	355.351	81.6
1978	349.627	85.3
1977	288.848	83.7
1976	243.365	82

Lines of business: Production of portland cement; mining and concentration of potash.

INDIANA LIMESTONE CO., THE

(year ended November 30)

Net sales

	In millions
1980	$3.727
1979	5.115
1978	5.265
1977	4.063
1976	5.167

Lines of business: The company quarries and fabricates Indiana limestone for use as a building material. By-product stone is sold for breakwater and shoreline protection in the Great Lakes area.

INLAND STEEL CO.

Lines of business: The company has operations in four business segments—integrated steel, steel service centers, steel-related operations, and shelter. Integrated steel operations include the manufacture and sale of steel mill products, and the mining, quarrying, and processing of iron ore, coal, and limestone used in steelmaking. The limestone and dolomite properties of the company are located in the Upper Peninsula of Michigan. A wide range of stone products is produced at the rate of approximately 3.4 million gross tons per year.

INTERPACE CORP.

Concrete pipe—net sales

	In millions	% of total sales
1980	$ 96.8	27%
1979	81.9	25
1978	91.4	31
1977	81.8	44
1976	102.1	52

Lines of business: Construction and building products, including porcelain insulators; pumps; concrete pipe; heating, ventilating, air conditioning, and plumbing products; and structural brick.

IU INTERNATIONAL CORP.

Environmental services—revenues

	In millions	% of total revenues
1980	$181.2	8 %
1979	159.5	7.5
1978	112.7	5.7
1977	90.5	5.2
1976	68	4.5

Lines of business: Reclaims scrap metal from slag; recycles remaining material into construction aggregate; converts pollutants from coal-fired power plants to landfill material; sugar production; other agribusinesses; paper products and food distribution, etc.; pipe fabrication; motor carrier; etc.

JEFFERSON CORP.

(fiscal year ended March 31)

Concrete & adhesive operations—net sales

	In millions	% of net sales: Concrete operations	% of net sales: Adhesive operations
1980	$24.44	77.5%	22.5%
1979	19.03	77.5	22.5
1978	16.58	70.4	29.6
1977	17.82	75.4	24.6
1976	21.15	82.9	17.1

Lines of business: Concrete operations (consisting of production of ready mixed concrete, precast/prestressed concrete, sand, gravel); adhesive operations (manufacture, sale, and application of adhesives, coatings, and binders for use in concrete construction); and life and health insurance.

JIM WALTER CORP.

(year ended August 31)

Mineral & fiber products group—sales & revenues

	In millions	% of total revenues
1980	$654.582	33.5%
1979	664.696	34.1
1978	597.128	34.4
1977	510.599	35.5
1976	443.340	34.5

Pipe products group—sales & revenues

	In millions	% of total revenues
1980	$300.559	15.2%
1979	309.005	15.9
1978	299.537	17.3
1977	243.108	16.9
1976	220.423	17.1

Stone products group—sales & revenues

	In millions	% of total revenues
1980	$54.955	2.8%
1979	43.178	2.2
1978	39.300	2.3
1977	36.141	2.5
1976	36.058	2.8

Lines of business: Homebuilding group; mineral and fiber products group (roof shingles, gypsum wallboard, vinyl siding, foam insulation, etc.); pipe products group (concrete, steel and cast iron pipe, valves, and hydrants); coal, iron, and chemicals group; metal and wood products group; stone products group (crushed and dimension stone); paper

group; sugar operations; oil and gas operations; and savings and loan operations.

JOHNS-MANVILLE CORP.

Revenues	In millions		
	1980	1979	1978
fiber glass products	$610.07	$573.19	$514.28
forest products	508.19	497.39	
non-fiber glass insulations	279.44	267.86	231.19
roofing products	249.99	272.67	253.80
pipe products and systems	220.08	304.85	303.33
asbestos fiber	158.94	168.19	157.29
industrial and specialty products and services	340.93	308.39	290.84

Lines of business: Fiberglass products; forest products; pipe products and systems; roofing products; non-fiber glass insulations; asbestos fiber; and industrial and specialty products and services. J-M mines asbestos fiber, diatomaceous earth, and perlite. Perlite is used in industrial roof insulations, asbestos in asbestos-cement pipe, roofing, friction materials, and specialty products; diatomite in filter aids and fillers.

JUSTIN INDUSTRIES, INC.

Building materials—net sales

	In millions	% of total sales
1980	$121.926	62%
1979	131.060	71
1978	127.543	75
1977	105.610	73
1976	64.268	65

Lines of business: Building materials (brick, precast and prestressed concrete, concrete block, lightweight aggregate, and architectural stone); manufacture of boots, belts, and other leather goods; fabrication of ceramic cooling towers; and publishing. Building materials plants are located in Arkansas, Kansas, Kentucky, Louisiana, North Carolina, Oklahoma, Tennessee, and Texas.

KAISER ALUMINUM & CHEMICAL CORP.

Refractories Division—net sales

	In millions	% of total sales
1980	$197.7	6.1%
1979	197.4	6.8
1978	180.3	7.3
1977	152.8	6.8
1976	134.4	7.3

Lines of business: The corporation operates principally in six business segments—aluminum, agricultural chemicals, industrial chemicals, refractories, trading, and real estate. The refractories group includes production of agricultural dolomite; architectural and landscaping dolomite sand and stone; refractory brick and specialties; deadburned dolomite; clay/alumina brick and specialties; fireclay; insulating refractories; magnesium hydroxide; periclase/magnesite; and silica refractories.

KAISER CEMENT CORP.

Cement & clinker—net sales & operating revenue

	In millions	% of total revenues
1980	$214.073	91.62%
1979	238.180	91.76
1978	209.169	91.73
1977	160.751	90.59
1976	139.738	88.41
Concrete aggregates, & other—net sales & operating revenue		
1980	$19.590	8.38%
1979	21.397	8.24
1978	18.859	8.27
1977	16.701	9.41
1976	18.312	11.59

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Lines of business: Cement, ready mixed concrete, sand, gravel, crushed rock, coal, and natural gas.

Kaiser's five cement plants in the United States are located in California, Texas, Hawaii, and Montana. Three aggregate plants are located in California, Washington, and Texas. Ready mixed concrete plants are located in Seattle, Wash., Tacoma, Wash., and Austin, Tex.

Abroad, Kaiser Cement purchases cement for resale in certain world markets and engages in limited trading activities. The corporation also has major investments in a cement manufacturing firm in Indonesia and in a firm which is constructing a large cement plant in Hong Kong. Gypsum operations, which were carried on for many years, were discontinued in 1978; in 1979, the company changed its name from Kaiser Cement & Gypsum Corp. to Kaiser Cement Corp.

KEYSTONE PORTLAND CEMENT CO.

Sales, less discounts

	In millions
1980	$20.861
1979	22.436
1978	21.097
1977	16.674
1976	15.737

Lines of business: The company produces portland and masonry cement at its plant in Bath, Pa. Crushed limestone is supplied by an operating division. Another operating division mines bituminous coal for use in fueling the cement kilns.

KOPPERS COMPANY, INC.

Road Materials Group—net sales

	In millions	% of total sales
1980	$531.7	27.6%
1979	454.1	24.8
1978	304.1	19.2
1977	174.1	12.8
1976	134.7	11.3

Lines of business: Organic materials (phthalic anhydride, creosote, alkyd resins, etc.); road materials (sand, gravel, granite, limestone, trap rock, sandstone, slag, ready mixed concrete, bituminous concrete, and steel wire mesh); forest products (lumber); engineered metal products; and engineering and construction.

LAKE ONTARIO CEMENT LTD (CANADA)*

Sales

	In millions
1980	$89.346
1979	88.317
1978	78.364
1977	64.641
1976	54.845

Lines of business: Cement milling and production in Ontario, western New York state, and Michigan; ready mixed concrete, concrete block and brick, and aggregate businesses in Ontario.

LONE STAR INDUSTRIES, INC.

Cement—net sales (domestic)

	In millions	% of total sales
1980	$332.7	36.6%
1979	290	36.6
1978	241.5	37.9
1977	185	40.6
1976	143.4	36.3

Construction aggregates—net sales

	In millions	% of total sales
1980	131.6	14.5%
1979	127.2	16.1
1978	105	16.5
1977	75.8	16.7
1976	71	18

Concrete & concrete products—net sales (domestic)

	In millions	% of total sales
1980	$232	25.5%
1979	201.5	25.4
1978	147.1	23.1
1977	85.2	18.7
1976	71.5	18.1

Lines of business: Cement and related products which include the production and distribution of portland, masonry, and other types of cement, and the manufacture and distribution of ready mixed concrete and concrete products; mining, processing, and distribution of sand, gravel, and crushed stone; real estate operations, wholesale lumber operations, and the sale of other construction materials.

LOUISVILLE CEMENT CO.

Sales, less discounts

	In millions
1980	$76.732
1979	90.022
1978	75.607
1977	70.799
1976	69.747

Lines of business: Louisville Cement Co. is engaged in the manufacture and sale of portland and other types of cement. The company operates three cement plants.

**Division of Denison Mines Ltd. (Canada)*

MONOLITH PORTLAND CEMENT CO.

Portland cement—net sales

	In millions	% of total sales
1980	$49.763	86 %
1979	49.962	83.5
1978	32.802	79.8
1977	30.512	82.2
1976	24.920	83.7

Ready mixed concrete, asphalt, and rock aggregates—net sales

	In millions	% of total sales
1980	$8.130	14 %
1979	9.858	16.5
1978	8.291	20.2
1977	6.593	17.8
1976	4.869	16.3

Lines of business: The company produces portland cement, ready mixed concrete, asphalt, rock, and sand. Monolith operates a cement plant in California and one in Wyoming. Ready mixed concrete plants are in California and Wyoming; an asphalt plant and an aggregate plant are in California.

MICHIGAN GENERAL CORP.

Contracting group—net sales

	In millions	% of total sales
1980	$20.3	11.4%
1979	19.7	8.7
1978	19.5	9.7
1977	15.3	8
1976	13	7.6

Architectural concrete products

	% of Contracting Group net sales
1980	69.8%
1979	64.8
1978	64.4
1977	71.4
1976	73.3

Lines of business: Michigan General is comprised of 19 operating entities structured into five operating groups—highway safety; manufacturing; contracting; consumer products; and retailing. The contracting group manufactures concrete pipe, concrete blocks, cribbing for retaining walls, prestressed bridge beams for highway construction, precast and prestressed floor and roof systems, and other structural products. The group also produces architectural precast concrete wall panels, precast/prestressed structural components, concrete masonry units, concrete stave industrial and farm silos, and related products; provides commercial and industrial painting and decorating services; and sells paint, wall coverings, and related items.

MARTIN MARIETTA CORP.

Cement—net sales

	In millions	% of total sales
1980	$188.4	7.2%
1979	197.7	9.6
1978	181.2	10.3
1977	154.4	10.7
1976	143.7	11.9

Aggregates—net sales

	In millions	% of total sales
1980	$185.2	7.1%
1979	176.9	8.6
1978	157.7	9
1977	130.7	9.1
1976	116.1	9.6

Lines of business: Cement; aggregates; chemicals; aluminum; aerospace; investments. Cement company manufactures and sells portland and masonry cements for use in the construction industry. Aggregates company quarries, processes, and sells crushed stone, sand, and gravel, primarily for highway and general construction, and chemical-grade silica sand for use in the glass and foundry industries. Chemicals company consists of three divisions engaged in the manufacture and sale of concrete admixtures for the construction industry, dyestuff for the textile industry, and refractory materials for the steel industry. Martin Marietta Aluminum is principally engaged in the production of primary aluminum ingot, sold mainly to independent fabricators, and of aluminum mill products, sold principally to distributors and manufacturers in the building and transportation industries. The aerospace company designs, develops, and manufactures aerospace and defense systems, primarily for the U.S. Government.

McDONOUGH CO.*

(year ended January 31)

Building Materials Group—net sales

	In millions	% of total sales
1980	$84.9	18.8%
1979	73.8	17.7
1978	68.6	19.9
1977	55.6	18.2
1976	47.1	16.6

Lines of business: McDonough is a multi-product line company operating in three basic industries—building materials, footwear, and hand tools. The building materials group consists of the Gulf Coast Portland Cement and the Houston Shell & Concrete Divisions which produce cement and ready mixed concrete for the metropolitan Houston market; the Ohio River Division produces and markets sand and gravel in central Ohio and West Virginia.

Acquired by Hanson Industries, Inc., London, England, Jan. 30, 1981.

MEDUSA CORP.

(Subsidiary of Crane Co.)

Construction materials—net sales

	In millions	% of total sales
1980	$190.665	88.9%
1979	252.336	88.6
1978	244.	84.9
1977	216.755	89.8

Lines of business: The company has two major business segments—construction materials and construction services. The construction materials segment principally includes production and sale of cement products, stone, sand, gravel, and asphalt. The construction services segment includes highway safety construction and asphalt paving.

Vintage

QUOTATIONS make safety sense

"Chance is a word devoid of sense; nothing can exist without a cause."

Voltaire

"Nothing under the sun is ever accidental."

Gotthold Lessing

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MOORE MCCORMACK RESOURCES, INC.

Cement, concrete products and aggregates—sales and revenues

	In millions	% of total sales
1980	$142.4	22.2%
1979	64.9	14.1

Lines of business: Iron ore, coal, cement, concrete products, aggregates, oil and gas, bulk transportation, cargo liners. The cement, aggregates, and concrete products segment includes the production of ready mixed concrete, concrete block, portland cement, aggregates, and prestressed and architectural concrete structures.

NATIONAL GYPSUM CO.

Gypsum & related products—net sales

	In millions	% of total sales
1980	$353	42.3%
1979	391	38.4
1978	342	37.6
1977	267	35.7
1976	210	34.2
1975	171	32

Cement—net sales

	In millions	% of total sales
1980	N.A.*	—
1979	$164	16.1%
1978	145	15.9
1977	114	15.2
1976	97	15.8
1975	93	17.4

Lines of business: Gypsum and related products; wall and floor coverings; glass and metal products; specialty and other products such as tiles, exterior siding, lime, limestone, and manufactured housing.

**Negotiations for sale of the company's Cement Division to the General Dynamics Corp. were terminated. According to the 1980 Annual Report, National Gypsum is taking steps to find an alternative buyer.*

NORTHWESTERN STATES PORTLAND CEMENT CO.

(year ended November 30)

Net sales	In millions
1980	$37.002
1979	40.696
1978	43.097
1977	35.477
1976	29.959

Lines of business: The company manufactures cement in its plant in Mason City, Iowa, and markets the product in an area encompassing parts of the states of Iowa, Minnesota, North Dakota, South Dakota, and Wisconsin.

OGLEBAY NORTON CO.

Minerals operations—sales and revenues

	In millions	% of total revenues
1980	$23.517	13 %
1979	19.451	10
1978	15.270	9.3
1977	13.653	11.9
1976	10.146	8.7

Lines of business: Operations covers minerals, transportation, and manufacturing. The company is engaged in the production of iron ore, coal quartzite, silica sand, refractory and insulation materials, ferrous and nonferrous products. Quartzite is produced by its Central Silica Co. subsidiary in two plants in Ohio. Fracture sand for oil and gas well treatment is processed in Texas by its subsidiary, Texas Mining Co. Silica flour is made at Texas and California locations. The minerals operations segment covers quartzite sand and fracture sand production, oil and gas production, and fluorspar briquette manufacture.

OREGON PORTLAND CEMENT CO.

Net sales	In millions
1980	$55.075
1979	52.592
1978	45.600
1977	37.089
1976	33.569

Lines of business: The company operates three cement plants, two in Oregon and one in Idaho, and also is a producer of agricultural and chemical limestone products. Products are marketed in Oregon, Idaho, and Washington, and in parts of Utah, Nevada, Wyoming, and Montana.

PENN VIRGINIA CORP.

Industrial minerals—operating revenue

	In millions	% of total revenue
1980	$9.438	17.4%
1979	9.552	17.8
1978	9.376	23.7
1977	8.724	24.1
1976	6.894	24.2

Lines of business: Production of cement, lime, and crushed limestone; fly ash pozzolan marketing; coal land operations; oil and gas development; equipment manufacturing; investments.

H. K. PORTER CO., INC.

Cement—net sales

	In millions	% of total sales
1980	$62.922	9.6%
1979	82.964	12.9
1978	75.497	13.8
1977	39.415	8.2

Lines of business: The company operates in six principal areas—industrial products, electrical products, industrial distribution, steel, specialty metals, and cement. The cement segment started with the acquisition, in 1977, of Missouri Portland Cement Co.

PUERTO RICAN CEMENT CO., INC.

Cement and related products—net sales

	In millions	% of total sales
1980	$72.865	93.2%
1979	57.104	90.2
1978	57.804	95.5
1977	54.016	93
1976	53.448	95.4

Lines of business: Cement and related products including portland cement and hydrated lime; multiwall paper bag manufacture; and real estate development.

ST. LAWRENCE CEMENT CO. (Canada)

Cement—net sales

	In millions	% of total sales
1980	$109	47%
1979	139	54
1978	114	49
1977	85	43
1976	62	39

Stone & building materials—net sales

	In millions	% of total sales
1980	$52	22%
1979	52	20
1978	42	18
1977	43	22
1976	39	24

Ready mixed concrete—net sales

	In millions	% of total sales
1980	$51	22%
1979	48	19
1978	43	19
1977	47	24
1976	47	30

Lines of business: Operation of cement plants, stone quarries, sand and gravel pits, ready mixed concrete plants, concrete block plants, prestressed concrete plants, concrete pipe plants, building materials centers, fuel oil and lumber distribution centers, and asphalt plants. These activities are conducted in Quebec, Ontario, and New York.

Outlook for 1985*

Total value of construction put in place in 1985 should be $390 billion to $420 billion. This assumes annual inflation of construction costs of about 8% and a real increase in annual construction d mand of 3 to 4% between 1980 and 1985. This also assumes that Congress will find the necessary funds to finance the repairs and additions needed for highways and other public construction projects. There is an increasing interest in providing more incentives for capital formation and improved productivity in the private sector, which could benefit the construction industry.

Housing markets in the decade of the 1980s are expected to benefit from a strong demand for owner-occupied units as a result of rising incomes, inflation, and the maturation of babies born following World War II. The number of households in the United States showed an average annual increase of 1.2 million between 1965 and 1970; 1.5 million between 1970 and 1975; and 1.6 million between 1975 and 1980. Estimates of the average annual increase in the number of households prepared by the Bureau of the Census range from a low of 1.3 million to a high of 2.1 million for 1980-1985 then drop to the 1.0 million to 1.8 million range for the 1985 to 1990 period. This increase in the rate of new household formations will add to the demand for housing throughout the 1980s especially for the first part of the decade. This demand will be filled from a combination of newly constructed units, mobile homes, and units converted from the existing housing stock and nonresidential structures. Other studies show a strong and growing preference for detached single-family houses.

Based on demographics and other data, conventional housing starts could reach 2.1 million units in 1985, including 1.4 million (67%) single-family units and 700,000 (33%) multifamily units. In addition, estimates show that 350,000 mobile home units could be built.

Source: 1981 U.S. Industrial Outlook for 200 Industries with Projections for 1985, U.S. Dept. of Commerce, January 1981

SOUTHDOWN, INC.

Cement—revenues

	In millions	% of total revenues
1980	$181.476	74.6%
1979	172.650	79.4
1978	144.714	63.3
1977	124.362	64.6
1976	99.078	55.4

Lines of business: Oil and gas production and cement manufacture. Southwestern Portland Cement Co., Southdown's cement subsidiary, operates plants in California, Ohio, and Texas.

STANDARD INDUSTRIES, INC. (Canada)

(year ended March 31)

Net sales

	In millions
1980	$122.592
1979	100.388
1978	93.982
1977	84.079
1976	74.854

Lines of business: Sand, gravel, crushed stone, slag cement, ready mixed concrete, concrete pipe, concrete block, asphaltic concrete, highway paving.

TEXAS INDUSTRIES, INC.

(year ended May 31)

Concrete products—sales & revenues

	In millions	% of total revenues
1980	$257.8	91.2%
1979	208.6	92.9
1978	177.2	93.4
1977	142.1	93.6
1976	127.4	91.2

Lines of business: Concrete products segment includes cement, aggregates, ready-mix, concrete block and brick, concrete pipe, prestressed concrete products, and architectural precast panels. The construction operations segment includes highway construction contracting, hot-mix asphalt paving, masonry contracting, and concrete contracting.

UNITED STATES GYPSUM CO.

Gypsum products—net sales

	In millions	% of total sales
1980	$643.261	43.6%
1979	701.237	46
1978	623.730	44.6
1977	480.475	40.8
1976	363.753	37.8

Lines of business: Industry segment sales by the company in 1980 were: gypsum products, 44%; refractories, 17%; metal products, 12%; wood fiber and mineral fiber, 10%; other products, 17%.

VULCAN MATERIALS CO.

Construction materials—net sales

	In millions	% of total sales
1980	$314.378	41.7%
1979	316.982	42.4
1978	291.746	44.7
1977	229.130	44.8
1976	181.847	44.2

Lines of business: Vulcan Materials is a multi-industry company operating in three basic businesses—construction aggregates production; chemicals manufacture, including chlorinated hydrocarbons and other industrial and agricultural chemicals; and production of secondary aluminum, detinned steel scrap, and tin chemicals.

In 1980, the Construction Materials group operated 90 facilities in 12 states for the production of crushed aggregates. These aggregates consist of crushed stone (granite and limestone), slag, sand and gravel, expanded lightweight shale, dolomitic lime, and mineral filler. Crushed stone was produced at 80 plants.

The company also operates three sand and gravel plants, four slag plants, a lime plant, an expanded lightweight shale plant, a mineral filler plant, and a pulverized limestone plant. Other products and services include ready mixed concrete and asphaltic concrete manufacture, truck sales and service, and miscellaneous materials processing activities.

WHITEHALL CEMENT MANUFACTURING CO.

Sales, less discounts

	In millions
1980	$21.531
1979	20.362
1978	21.286
1977	14.852
1976	14.235

Lines of business: The company is engaged in the production and sale of portland cement. Plant and office are located in Whitehall, Pa. ●

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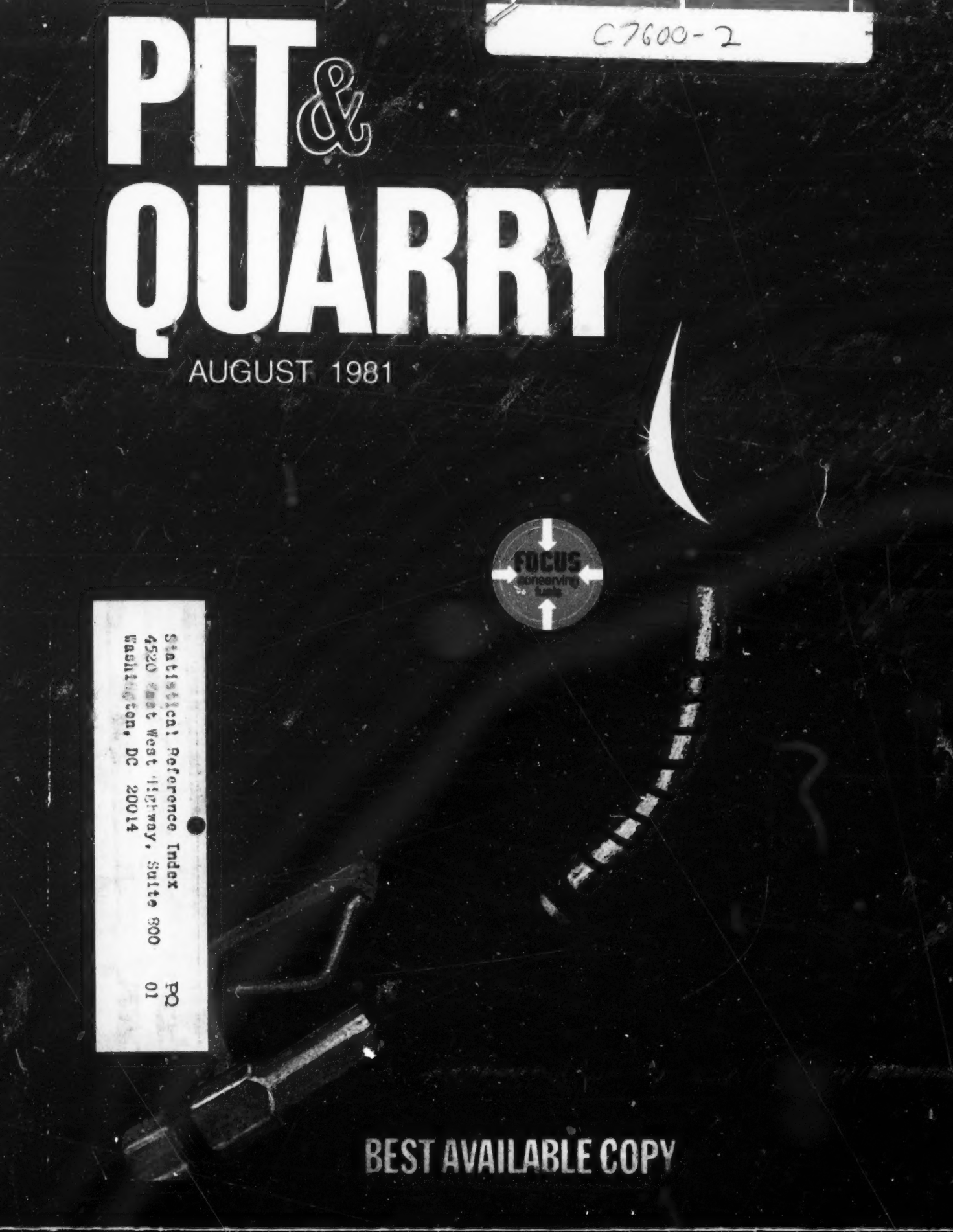
PIT & QUARRY

AUGUST 1981



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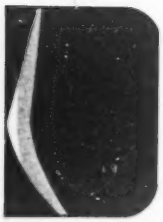

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AND NEXT MONTH

A breakthrough in crusher performance analysis, and a new grinding technology are reported in Focus features.

ON THIS MONTH'S COVER

The symbolic return of a drop of fuel to the nozzle is equivalent to saving that drop, the prime discussion point of Focus features in this issue. (Staff art)

Executive and Editorial Offices: 105 W. Adams St., Chicago, Illinois 60603. Phone (312) 726-7151.

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MEMBER

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COMPARISON OF 1981/1980 CONSTRUCTION CONTRACT VALUES*

	1981 5 Mos.	1980 5 Mos.	Cumulative % Change
Nonresidential Building	$23,574.3	$19,964.5	+18
Residential Building	26,847.9	21,625.1	+24
Nonbuilding Construction	11,696.0	12,857.9	− 9
Total Construction	$62,118.2	$54,447.5	+14

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(1972 = 100, seasonally adjusted)
March, 1981 ..... 183 April, 1981 ..... 172 May, 1981 160

**Based on statistics compiled by F.W. Dodge Div., McGraw-Hill Information Systems Co.*

Noise Control Workshops For Mobile Equipment Personnel

Mine operators, shop foremen, safety personnel, or others responsible for mobile equipment noise control are being invited to take part in a series of free workshops. The U.S. Bureau of Mines is sponsoring the workshops, "Retrofit Noise Control of Front-End Loaders," to be held this fall in five states. This series is a follow-up to the Bureau's Bulldozer Noise Control workshops which were well received last year.

The fall workshop series will be held the following dates and locations: September 29—Washington, Pa.; October 2—Louisville, Ky.; October 7—Duluth, Minn.; October 14—Denver, Colo.; and October 29—Seattle, Wash.

Engineers from Bolt Beranek and Newman Inc., the firm that conducted the loader noise control research under contract to the Bureau of Mines, will present the workshops. Topics to be discussed include the basics of noise control and measurement, which apply to all mobile equipment, and specific treatment fabrication and installation for front-end loaders. Examples of noise control materials and hardware will be displayed.

To reserve a place at the workshop nearest your operation and obtain more information on workshop locations contact: Carol Prybylo, Bolt Beranek and Newman Inc., 50 Moulton St., Cambridge, Mass. 02238.

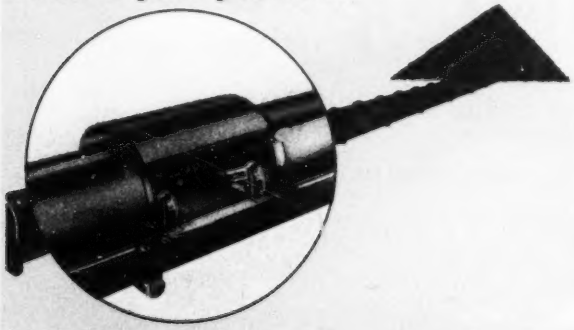
Correction

In the June 1981 issue of P&Q we published a news item stating that Polysius Corp., Atlanta, Ga., had been awarded a contract for $1 million by the Suez Cement Co. The contract, for a 1.4-million-mtpy cement plant, was in excess of $100 million.

ASLA/NCSA Announce Winners Of 1981 Student Competition

Students in landscape architecture programs at Michigan State University, and the University of North Carolina received top prizes in the sixth annual American Society of Landscape Architecture/National Crushed Stone

Shelter your profits!



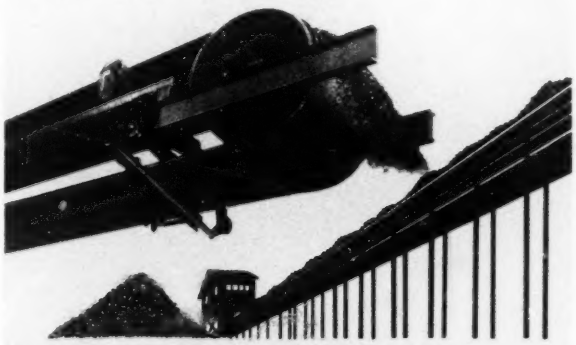
New S-A belt conveyor hoods give all-weather protection to materials, belts, idlers!

• Reduce costly material los. from wind and rain . . . protect belts, idler rollers from sun-drying and freeze-ups. • 4' cover sections are quick opening, easily installed. • Simple design—cover sections supported on bends that bolt directly to foot brackets. • Rugged construction—cover sections and supporting hardware are of heavy-gauge galvanized steel. Bolts, nuts, washers are cadmium-plated. • Available from stock in 24", 30", and 36" belt sizes. For more information, write or call Stephens-Adamson, Inc., Aurora, Ill. 60507. (312) 892-4311.

STEPHENS-ADAMSON, INC.

Circle 11 on card, page 131

Clean belts last longer!



S-A spring-type cleaners protect costly conveyor belts with the simplest, most effective cleaning action!

• Cleans completely—overlapping blades on spring arm seat uniformly on belt surface; completely remove wet, dry or sticky materials from belt. • No moving parts—requires no drive of any kind. • Won't injure belts or catch on belt surfaces. • Prevents materials from being ground into belt. • Easy to install and operate. • Adjustable to fit any size conveyor frame. For more information, write or call Stephens-Adamson, Inc., Aurora, Ill. 60507. (312) 892-4311.

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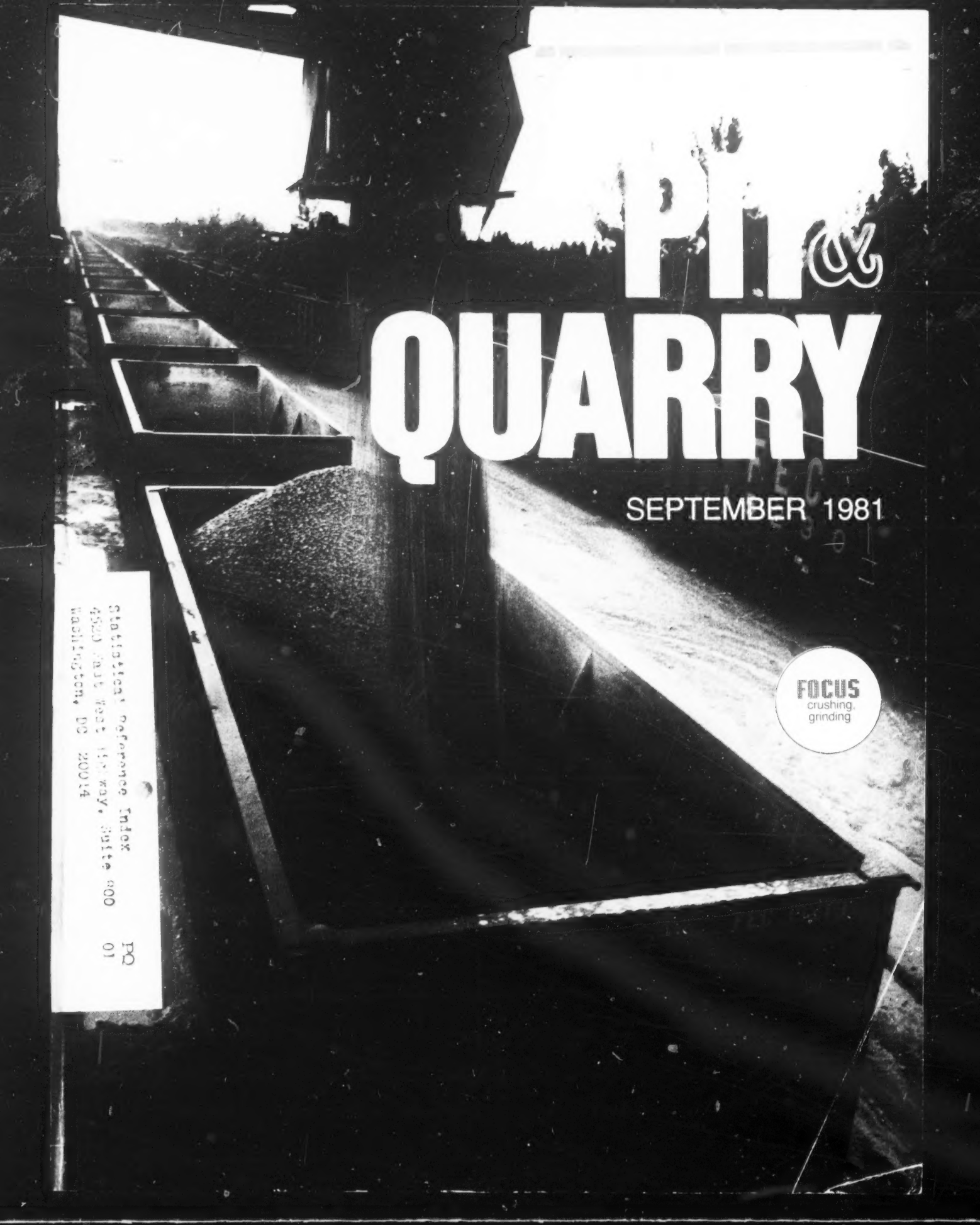
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SEPTEMBER 1981
FOCUS
crushing,
grinding

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AND NEXT MONTH

Major features discuss maintenance factors from metal wear to kiln refactories.

ON THIS MONTH'S COVER

Dedicated trains of rapid discharge equipment boost shipping efficiency for aggregate producers around the country. Page 66.

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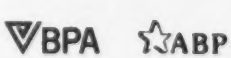

COMPARISON OF 1981/1980 CONSTRUCTION CONTRACT VALUES*

	1981 6 Mos.	1980 6 Mos.	Cumulative % Change
Nonresidential Building	$28,853.5	$24,963.6	+16
Residential Building	32,704.6	26,895.1	+22
Nonbuilding Construction	15,106.9	15,680.1	− 4
Total Construction	$76,665.0	$67,538.8	+14

DODGE INDEX
(1972 = 100, seasonally adjusted)
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**Based on statistics compiled by F.W. Dodge Div., McGraw-Hill Information Systems Co.*

Ohio State University Reactivates Mining Engineering

Ohio State University has reactivated its master of science degree in mining engineering with courses to start this fall. The program will include specialty areas in explosives, surface mine equipment use, coal and mineral preparation, mining management, and strata control.

Ohio State also is the site of the state's only federally funded Mining and Mineral Resources Research Institute—one of the original such institutes in the nation.

ARPA Honors Ronstadt

Karl G. Ronstadt, president and chairman of the board of New Pueblo Constructors, Inc., recently was presented an award of merit upon his retirement from 6 years of service with the Arizona Rock Products Association. Ronstadt, also a former president and board member of the Arizona Chapter of the Associated General Contractors, was recognized for outstanding and worthy contributions for his years of service as an officer and member of the ARPA.

Swedish Blasting Technique For Populated Areas

A new blasting technique which allows rock blasting to be carried out in close proximity to buildings without risk of structural damage has been developed by Skanska Cementgjuteriet (Skanska), Sweden's leading contractors, according to the construction magazine *Byggindustrin*.

Called "slot drilling," the method provides for a number of equally spaced holes to be drilled by means of specially designed drilling equipment. This creates a slot in the rock through which blasting vibrations cannot pass. Slots can be drilled flush with house foundations and blasting can proceed without hazard.

The slot drilling system allows blasting near buildings with charges that are 10 times stronger than normal, it is stated, while blasting costs are nearly halved. Other advantages include improved rock stability, reduced need for reinforcement, increased safety, and smoother post-blasting surfaces.

UTLX hopper cars are backed

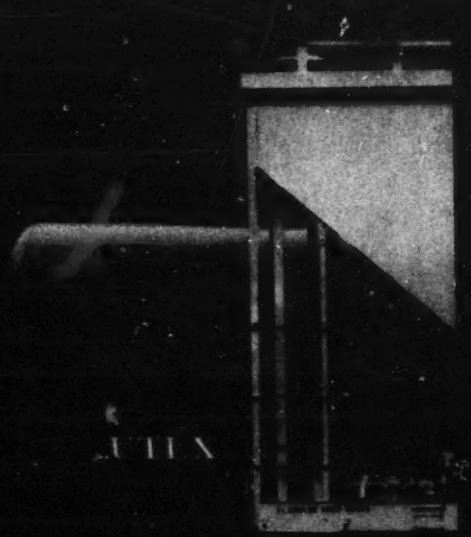
Six models from 3000 to 5820 cu. ft. You're looking at a new breed of hopper cars from a well-known name in rail car building—Union Tank Car.

Six UTLX hopper car models are now available, each designed for grain, salt, sand, plastic pellet or general commodity service. In 3000, 3500, 4000, 4750, 5250 and 5820 cu. ft. capacities.

Easy aggregate and dry chemical handling. A common cause of headaches, the center sill, is gone. Smooth, unobstructed hoppers provide faster, more complete unloading without commodity residue. All models feature large 30" easy-opening UTLX hatches and maximum size outlet gates. Reinforced partitions and tubular side plates add strength without extra weight. Overall smooth interiors improve lining application for better protection from corrosives such as fertilizer and salt.

Lease or buy. You can lease these new cars or buy them outright. Full-Service leases are backed by nationwide maintenance, combined mileage credits for tank and hopper car fleets, MATCH mileage auditing service and cost-free UTIL-I-FAX™ subleasing.

To learn more, write for our brochure. Union Tank Car Company, 111 W. Jackson Blvd., Chicago, IL 60604. Or call your local UTLX office. Our district representatives earn their good name, too.



Union Tank Car

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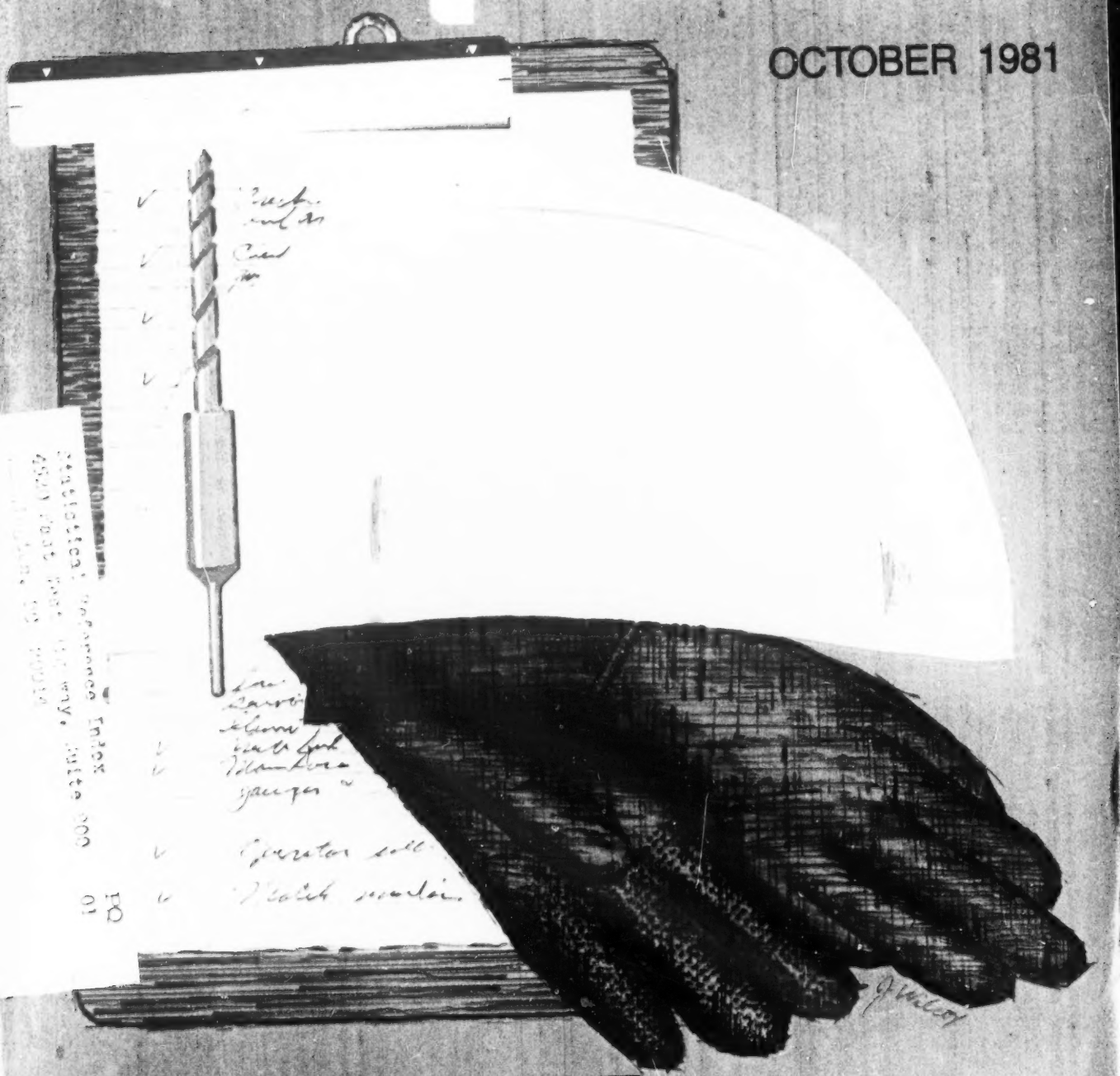
OCTOBER 1981



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AND NEXT MONTH

Screen efficiency, size and a drive component will be discussed in Focus features

ON THIS MONTH'S COVER

Maintenance planning, procedures and supportive products are subjects of feature reports in this issue. Cover by Janet Wilcox.

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BPA ABP

Paris Site for International Lime Association Congress

Paris, France will be the site for the 5th International Lime Association Congress on July 1-2, 1982. The 1982 Congress will cover: energy problems, environmental protection, and developments in lime utilization. In addition, program activities will include tours of lime, steel, and atomic facilities; sightseeing in Paris; and a reception and dinner at the Palace of Versailles.

Information on the International Lime Association Congress can be obtained from National Lime Assn., 3601 North Fairfax Dr., Arlington, Va. 22201.

U.K. Encourages Industry To Conserve Energy

The aim of the United Kingdom Government's Energy Conservation Demonstration Projects Scheme is to encourage the widespread adoption of energy conservation technologies by demonstrating their technical and economic effectiveness in operation. Grants of up to 25% are available for energy-saving plants.

COMPARISON OF 1981/1980 CONSTRUCTION CONTRACT VALUES*

	1981 7 Mos.	1980 7 Mos.	Cumulative % Change
Nonresidential Building	$34,267.8	$29,760.5	+15
Residential Building	38,580.7	33,088.1	+17
Nonbuilding Construction	17,899.5	18,184.0	− 2
Total Construction	$90,748.0	$81,032.6	+12

DODGE INDEX
(1972 = 100, seasonally adjusted)

May, 1981 ..... 160 June, 1981 ..... 170 July, 1981 153

**Based on statistics compiled by F.W. Dodge Div., McGraw-Hill Information Systems Co.*

The largest such project to date involves almost £ million of government funding to help the Rugby Portland Cement Co. Ltd. convert a 530-mtpd wet cement kiln at its Southam Works, Warwickshire, to operate as a semi-wet plant. When completed in early 1982, the specific fuel consumption of this kiln will be reduced by 35%—from 1,650 to 1,050 kg of product—and its capacity raised by 30%.

Conversion to the semi-wet process is particularly attractive because the kiln requires no major modifications; only the removal of chains and the incorporation of some additional refractories, which can be carried out with a minimum of downtime. The projected 30% increase in kiln capacity results from the greatly reduced evaporative duty required of the kiln.

At Rugby Portland, the increased throughput of the converted kiln may enable the company to shut down an old thermally inefficient wet kiln which requires considerable maintenance. This would be a cost-saving bonus.

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